The IRON AGE

The National Metalworking Weekly



In-Plant Gambling: Everybody Gets Hurt P 35

Is Steel Pinched For Expansion Money? P.38

How Government Censorship Straps Industry P.40

Digest of the Week P-2

Trade names you can trust!

Chromel-Alume

FOR ACCURACY!

Chromel-Alumel thermocouple alloys are unconditionally guaranteed to register true temperature—e.m.f. values within close specified limits . . . $\pm 4^{\circ}F$. from 0° to 530°F.; $\pm \frac{3}{4}\%$ at operating temperatures from 531° to 2300°F.

FOR DURABILITY!

They're highly resistant to oxidation, extremely sensitive to temperature variations. And they maintain their fine accuracy over a wider range of temperatures for far longer periods of time than any other base metal material.

FOR ECONOMY!

Despite their finer accuracy, higher temperature range, and longer useful life, Chromel-Alumel thermocouple wire costs the user no more than ordinary base metal materials...and in many cases, they actually cost less!





Ask for them by name! Your instrument manufacturer or pyrometer service company can supply your immediate requirements for plain or insulated wire and assembled couples. So ask for them by name..."Chromel-Alumel" thermocouples...trade names you can trust!

Chromel-Alumel thermocouple alloys are produced exclusively by

HOSKINS MANUFACTURING COMPANY

4445 LAWTON AVENUE . DETROIT 8, MICHIGAN



Always ready . . . always able to handle your drop forge designs

Bethlehem's drop forge shops are ready for you-always!

You can depend upon us for volume production. Even more important, you have the assurance of expert workmanship. Unless you have been through the Bethlehem shops, it is hard to visualize their full extent and the care with which each step in an order is handled.

Bethlehem produces an almost endless variety of designs for the oil, mining, aviation, automotive, electrical, and other industries. This is made possible by strictly first-class facilities, which include a modern die-sinking plant, steam and board drop hammers to 8,000 lb, mechanical presses to 3,000 tons, upsetters to 9 in., and full heat-treating equipment.

We're anxious to do business with you. Why not call us when you are next in the market for closed-die forgings? You'll find our prices and deliveries are fully competitive.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL



Digest of the Week in Metalworking

Starred items are digested at right.

EDITORIAL Let's Not Kid Ourselves **NEWS OF INDUSTRY** *Special Report: Are Gamblers in Your Plant?... *Communication: Industrial Radio's Growing. 37 *Expansion: Steel—A Time for Decision 38 40 *Government: Censorship Causes Concern.... *Production: Watch Magnesium Tooling Plate... 41 Business: Capital Spending To Climb in '56... *Materials Handling: LPG Moves In on Trucks... 43 *International: Reds Peddling Surplus Tinplate... **NEWS ANALYSIS** Newsfront 52 *West Coast Report 61 *Machine Tool High Spots 63 TECHNICAL ARTICLES *How To Select Machine Tool Lubricants *Two Methods for Welding Zirconium ... *Can Specimen Size Affect Tensile Testing?.... *Cut Paperwork With A Single-Form System.... *Ultrasonic Inspection Spots Danger Early 88 **MARKETS & PRICES** *The Iron Age Summary—Steel Outlook...... 127 Steel Product Markets 128 Comparison of Prices 129 Comparison of Prices Steel Prices 137 REGULAR DEPARTMENTS Free Literature INDEX OF ADVERTISERS 152

Copyright 1956, by Chilton Co. (Inc.)

THE IRON AGE, published every Thursday by CHILTON CO. (INC.). Chestnut & 56th Sts., Philadelphis 39, Pa. Entered as second class matter, Nov. 8, 1982, at the Post Office at Philadelphis under the act of March 3, 1879. Price to the metalworking industries only, or to people actively engaged therein, 25 for 1 year, 28 for 2 years in the United States, its territories and Canada. All others 815 of 1 year, 2011. Since there were membrane countries, 815; other Foreign Countries, 815; ot

Address mail to The IRON AGE Chestnut and 56th Sts. Philadelphia 39, Pa.

NEWS DEVELOPMENTS

INDUSTRIAL RADIO

SPEEDS COMMUNICATIONS

Pocket sized, transistorized units are moving into the plant. Industryowned equipment has already taken over communications in some industries. Pocket unit works out in high sound areas.

A TIME FOR DECISION IN STEEL EXPANSION P. 38

The 15-million ton expansion is off to a slow start. Steel companies are worrying more today about where to get the money than they are about forthcoming wage negotiations. Money will have to come from higher prices and increased earnings to bolster borrowing power.

CENSORSHIP CAN HIDE INEFFICIENCY

Growing tendency of federal officials to hide behind censorship has the Capital concerned. Bureaucrats avoid criticism by clamping down news blackouts. Scientists charge that lack of information hurts scientific progress. Congressional subcommittee will look into problem.

P. 40

REDS PEDDLING THEIR SURPLUS TINPLATE

Since 1950 Russia has doubled her output of tinplate. Satellites also have increased production. But the Communist countries don't use much tinplate. So Russia is in the midst of a major sales campaign to Free World.

SHELL MOLDING CUTS COSTS AT PONTIAC

GM division now has 100 pct shell molding of crankshafts. Results show savings in tooling life and machining costs. Trend to more complex engine parts that are difficult to forge gives shell molding big future.

THE IRON AGE

P. 52



4

PLANT GAMBLING can cost your plant millions, lead to undermined authority and inefficiency. Overlooked or condoned "small" games can result in syndicate's moving into your plant. Time to act is when symptoms show up in plant activity. Story P. 35.

WILL AIRCRAFT REACH LABOR SETTLEMENT? P. 6

Although situation in aircraft industry labor negotiations is still critical, betting is that a strike will be avoided. Lockheed signs 2-year pact amounting to 15¢ per hour plus pension and fringes. Pensions are major issue elsewhere in current aircraft industry negotiations.

SPECIAL FEATURES

HOW TO SELECT MACHINE TOOL LUBRICANTS P. 75

Better than 90 pct of your lubrication requirements can often be handled by four or five grades of oil and by two greases. If you use more, chances are it's costing you too much. With machine tool builders' cooperation, dozens of oils and greases in your stockroom may be cut to a few without impairing efficiency.

WHICH METHOD'S BEST FOR WELDING ZIRCONIUM? P. 79

Zirconium, while pretty much limited right now to use in nuclear reactors, is a metal you're bound to hear more and more about. Some of its outstanding properties slate it for a bright industrial future. Welding is an important part of its fabrication. Two methods have been proposed. This article tells why resistance, rather than fusion welding, seems to be the best bet.

CAN SPECIMEN SIZE AFFECT TENSILE TESTING? P. 82

Tensile testing is of value only when it is accurate, dependable. Inaccurate results can sometimes lead to harmful and costly errors. Is accuracy affected by specimen size? As a rule, it is not—at least for unnotched specimens. But tests with notched specimens tell a different and very important story.

CUT PAPERWORK WITH A SINGLE-FORM SYSTEM P. 86

An ingenious new single-form, 14-part order handling system gives this Cleveland firm complete control over order-production-invoicing operations. Initial writing now puts basic data at all needed points at once. Copying is unnecessary. Customer orders now move faster through the paperwork mill. Copying errors are eliminated.

ULTRASONIC INSPECTION SPOTS DANGER EARLY P. 88

Possibility of in-service failure of equipment is always disturbing. In high-temperature, high-stress applications, complete disassembly and detailed parts inspection usually is needed to maintain desired safety factor. Ultrasonic inspection can cut costly downtime, detect flaws long before they lead to failure.

MARKETS AND PRICES

DON'T OVERLOOK MAGNESIUM TOOLING PLATE P. 41

Although it was only introduced in April, 1954, magnesium tooling plate is looking forward to sales of over 1 million lb in 1956. Big markets are appliance, aircraft and automotive for jigs, fixtures and patterns.

LPG MOVES INTO

Liquefied petroleum gas is getting a big play from fork lift truck, towing tractor and crane operators. Big selling points for the fuel are lower costs per gal, less downtime for truck maintenance.

FORMING-AND-SHAPING TOOL SALES BOOM

Sales of forming and shaping tools are about 25 pct of all types of machine tool sales. Total for 1955 is \$207 million. Presses amounted to \$378 million last year, a 129 pct gain over 1954. Backlogs of press builders stretch out 16 months.

QUESTION IN STEEL: HOW TO KEEP UP?

P. 127

P. 43

Biggest problem confronting steel producers is how to keep up with demand. Mills are straining to maintain high production in face of inclement weather and other difficulties. No letdown in sight.

ANACONDA ANNOUNCES A BIG SWITCH

P. 134

Effective this week all copper from Anaconda subsidiaries will cost the consumer a price pegged on the London Metals Exchange. Kennecott expected to go along. Spells confusion until producers explain their systems.

NEXT WEEK:

WAREHOUSES CAN SAVE

Even if you are a regular buyer direct from the mill, it might pay to look into the intricacies of warehouse buying. Savings in storage, scrap loss, and other costs might be enough to offset higher warehouse prices. Situation is analyzed in special study next week.

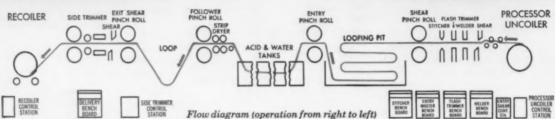
TUBE-IN-STRIP: BONANZA FOR PRODUCT DESIGNERS

In coil form, it looks like an ordinary mill product. The difference: for the first time, hollow tubing and metal strip are combined in a single sheet of either copper, brass or aluminum. Attractively priced, the new mill product can be readily stamped or drawn to fit your application.

Continuous Pickling Line at Pittsburgh Steel is CLARK Controlled!







This Wean Engineering Co. continuous pickling line at the Pittsburgh Steel Co.'s Allenport, Pa. mill is powered by 7 DC strip-drive motors and 39 AC auxiliary motors totaling 1409 HP-all efficiently controlled by Clark apparatus.

Designed for a normal operating speed of 500 FPM, this 60 inch combination pickling and side trimming line consists of three sections. The entry section includes the processor uncoiler, shear, welder, flash trimmer, stitcher, and shear pinch roll. The center section includes the entry pinch roll, acid and water tanks, strip dryer and follower pinch roll. The delivery section includes the exit shear pinch roll, shear, side trimmer and recoiler. The control system employs current limit and voltage regulation in all three sections to provide for the most efficient utilization of the available horsepower.

CLARK engineered controls for processing lines are the cumulative result of years of engineering experience. These controls embody the latest circuit designs and devices and are continually being improved to keep pace with production and safety requirements as determined by modern mill practice.

For all types of Processing Lines CLARK engineering "know-how" provides you with dependable, complete control. Consult our nearest District Office for details.



CLARK Control Panel for Center and

The CLARK





CONTROLLER

1146 East 152nd Street

R Company

IN CANADA: CANADIAN CONTROLLERS, LIMITED . MAIN OFFICES AND PLANT, TORONTO

Mechanized molding results in better castings . at lower cost

• Osborn Rota-Lifts produce uniform molds from large matchplate patterns simply and efficiently.

Rota-Lift® jolts, rolls over, squeezes, draws and closes the mold . . . all mechanically.

The Rota-Lift models accommodate a wide range of foundry molding jobs. An Osborn foundry specialist will gladly show how a Rota-Lift can improve and increase your mold production. Write The Osborn Manufacturing Company, Dept. FF-40,





Leader in automation for the foundry L



MOLDING MACHINES

INDUSTRIAL BRUSHES



or solid



a steel tube or bar for every purpose

TUBING: SEAMLESS AND WELDED

Whatever your tubing requirement—whatever kind and quantity you need—you can get quick delivery of a quality product with a single call to Ryerson.

That's because Ryerson stocks are the nation's largest, including more types and sizes, more tonnage, than any other source. And Ryerson service facilities are unequalled, too.

Hack saws, band saws and equipment for production lathe cutting and chamfering assure quick service on your orders. In addition, a staff of tubing specialists puts years of experience to work on your problems of tubing selection and fabrication. So call Ryerson for everything in tubing and tubing service.

In stock: Cold drawn and hot rolled seamless mechanical tubing, hot and cold rolled welded tubing, hydraulic and cylinder tubing, structural tubing, etc.

COLD FINISHED BARS

Careful handling, accurate cutting, vigilant inspection—these are just three of many ways in which Ryerson assures you of the highest quality in cold finished bars.

Stored in temperature-controlled rooms, spark-tested to guard against mixed steels, Ryerson cold finished bar stocks include rounds, squares, hex's, flats—screw steel, accuracy stock, turned, ground and polished shafting, Ledloy for fastest machining—everything you need. And even the hard-to-get intermediate sizes are on hand.

To help you select the best cold finished bar for each application, we have just published a simplified guide showing the comparative strength, cost, machinability, workability, etc. of all commonly used types. Write for your copy and call Ryerson when you need high quality cold finished bars.

RYERSON STEEL

In stock: Bars, structurals, plates, sheets, tubing, alloy and stainless steel, reinforcing bars, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK . BOSTON . PHILADELPHIA . CHARLOTTE, N. C. . CINCINNATI . CLEVELAND DETROIT . PITTSBURGH . BUFFALO . CHICAGO . MILWAUKEE . ST. LOUIS . LOS ANGELES . SAN FRANCISCO . SPOKANE . SEATTLE



Chestnut and 56th Sts.
Philadelphia 39, Pa.
SHerwood 8-2000

GEORGE T. HOOK, Publisher
EDITORIAL STAFF

TOM C. CAMPBELL, Editor-in-Chief GEORGE F. SULLIVAN, Editor Managing Editor E. C. Beaudet News-Markets Editor J. B. Delaney Technical Editor J. J. Obrust Engineering Editor W. G. Patton Machinery Editor J. J. Obrust Astalian George Associate Editors: J. Egan, Jr. Metallurgical Editor J. A. Degen Associate Editors: J. C. Long, D. G. Plicinich, C. B. Moore, F. J. Starin. Assistant Editors: P. J. Carhey, Regional Editors: K. W. Bennett, Chicago, T. M. Rohan, Cleveland; T. L. Carry, Detroit; G. G. Carr, New York; R. R. Kay, Los Angeles; G. J. McManus, Pirtsburgh; G. H. Boker, R. M. Stroupe, N. R. Regeimbal, Washington. Production Assi.: C. G. Herndon. Correspondents: F. L. Allen, Birmingham; N. Levenson, Boston; R. M. Edmonds, St. Louls; J. Miller, San Francisco; R. Kazarian, Buffalo; D. A. Coughlin, Seattle; F. Sanderson, Toronto; F. H. Harley, London, England: Chilton Editorial Board: Paul Wooton, Washington representative.

WASHINGTON EDITORIAL OFFICE Washington 4.... National Press Bldg.

Production Manager
Director of Research
Circulation Mgr.
Promotion Manager
Asst. Research Dir.

BUSINESS STAFF
Warren Ovens
W. Marcoffey
W. M. Coffey
W. Loimbeer

Philadelphia 39
Séth & Chestnut Sts. Sherwood 8-2000
Pittsburgh 22 J. M. Spackman
1502 Park Bidg. Atlantic 1-182
W. Hartford 7 Paul Bachman
& LoSaile Rd. Adams 2-0486
England Harry Becker
National Provincial Bank Chambers,
15 Gration St., Altrincham, Cheshire.
One of the Publications Owned and
Published by Chilton Co. (Inc.), Chestnut & Séth Sts., Philadelphia 39, Pa.

OFFICERS AND DIRECTORS
Joseph S. Hildreth, Ch. of the Board
G. C. Buzby, President
Vice-Presidents: P. M. Fahrendort,
Harry V. Duffy; Treasurer, William H.
Vallar; Secretory, John Blair Moffett;
Directors: George T. Hook, Maurice
E. Cos., Franh P. Tighe, L. V. Rowlands,
Robert E. McKenna, Irving E. Hand,
Everit B. Terhune, Jr., R. W. Cose, Jr.,
John C. Hildreth, Jr.
Indexed in the Industrial Arts Index
and the Engineering Index.

SFA NBP

EDITORIAL

Let's Not Kid Ourselves

• THERE IS NOTHING wrong with President Eisenhower's recent statement that our allies must live tradewise. They must trade outside their borders. If we don't buy from them, someone else must.

Our allies have to remain strong so they will not be a pushover for the Communists. That's what we want. That's the plan we have been supporting—and helping to pay for. But this is unrelated to some of the nonsense being passed out at Washington hearings about strategic material shipped to the Reds.

Some of the "explanations" about Iron Curtain shipments of copper, machine tools, and other machinery are asinine. Copper is in short supply—in any form—and is a defense item.

The Reds want copper—wire, scrap or any form—for defense or war purposes. Even if the wire they got from the free world was for "peaceful" purposes, that would release their own output for war or other aggressive uses. There is no excuse for Russia's big copper windfall.

Machine tools build up heavy industry. The Reds are hell-bent for heavy industry gains. If we or our allies unwittingly contribute machine tools to the Reds, we aid, abet and support their drive to:
a) build a war machine, b) release their capacity for more heavy industry use, and c) allow them the tools to overcome us in an economic war in Asia.

If our top diplomats and officials don't recognize the Red menace in all its forms, how can we expect the man on the street to be aware of the danger to our freedom and future?

Most of the delayed explanation given recently about Red trade is intellectual drivel. It doesn't answer the basic question: Why should the United States countenance or agree to strategic material trade with nations whose avowed purpose is to knock us out eventually by any means possible?

Anyone in his right senses doesn't ward off a mortal blow with his right hand and give the other fellow a new sword with his left. Whatever we do in this serious East-West trade situation, let's not kid ourselves.

Tom Campbell

EDITOR-IN-CHIEF

Design Punch FOR CAR

BUILDERS

- Tough, corrosion fighting stainless steel that will resist weather, road abrasion and flying stones, and return to its original brightness when wiped with a damp cloth ... that's what car buyers want these days.
- Designers with their fingers on the public pulse know this, and that's why next year more stainless steel will be used by the car manufacturers than ever before. A good percentage of this stainless steel will be supplied by Sharon . . . for more than half a century a leading producer of quality automotive steels

SHARON STEEL CORPORATION Sharow, Pennsylvania

DISTRICT SALES OFFICES: CRICAGO, CINCINNATI, CLEVELANO, DAYTON, DETROIT, GRAND RAFIDA, INDIANAPOLIS, LOS ANGELES, MILWAUSER, NEW YORK, PHILADELPHIA, ROCHESTER, SAN FRANCISCO, SHARON, SEATTER, MONTRALA, QUE TIORONTO, ONL

dear editor:

letters from readers

Survey Western Steel

Sir:

We are again approaching the time of the year in which we start intensifying our market research activities, and I want to ascertain your plans for the annual IRON AGE survey of western steel production. As you know, your report constitutes an integral part of our market research program, and I believe mill customers as well as other mills are quite interested in this annual feature of yours.

If there is any assistance we can render please do not hesitate to contact us, and I promise you will get the data for Kaiser immediately upon request. W. R. Riggs, Asst. Director, General Planning Department, Kaiser Steel Corp., Oakland, Calif.

Glad to know this feature is so helpful. Our West Coast Editor is now conducting the survey. It will appear in a forthcoming issue as a feature in our West Coast Report.—Ed.

Housing Starts

Sir:

Your excellent editorial "Don't Worry About Housing" has been read and admired by our entire executive staff.

We would consider it a very great favor if you would give us permission to reprint this editorial in our company news letter which is circulated to our complete sales force and architectural departments. A. Chriss, Sales Department, Lightolier, Jersey City, N. J.

Tooling S

Sir:

Please send up to four copies of "How to Get More for Your Tooling Dollar" for distribution in our Research and Development Department. We feel that tooling is one of the most important aspects in our development of automatic assembling machines such as our "Auto-Fab" printed circuit and assembling machine. J. D. Miller, Mechanical Engineer, Engineering Research & Development, General Mills, Inc., Minneapolis, Minn.

Sir:

With reference to your published offer in the March 8th issue of your excellent publication, we would deeply appreciate three or four reprints of Tooling, Section 1 and



Section 2 covering comparable Tool Brand Charts if still available.

You are to be complimented for the tremendous time consuming research and effort that went into these two specific sections and our sincere gratitude is extended. E. D. Bickford, Manager of Sales, Bethlehem Steel Co., Cleveland, Ohio.

Sir:

Your article on "How to Get More for Your Tooling Dollar" is very interesting and well prepared. I would like to take advantage of your offer to supply copies of this and would request that you send me 150 copies. E. E. Hall, Manager, Technical Service, Universal-Cyclops Steel Corp., Titusville, Pa.



WISH I HAD ORDERED FROM GARRETT

They never let you down on deliveries when you have to keep production going full speed.

You get what you order when you order it . . . from Garrett. No waiting for late shipments. You can't beat Garrett service. No worries about Garrett . . . quality. Every Garrett washer, hose clamp, stamping or assembly is right up to the peak of quality. High quality is assured by Garrett's "statistical quality control" system.

Next time no more headaches for me. I'll order from Garrett. Why don't you do the same when you need . . .

> LOCK WASHERS FLAT WASHERS HOSE CLAMPS STAMPINGS

Manufactured by

GEORGE K. GARRETT CO., Inc.
Philadelphia 34, Pa.





Insist on a...

ONE YEAR WARRANTY

when you buy an electric fork truck

All Baker battery-powered industrial trucks—including fork, platform, crane trucks and tractors—are warranted against defects for a full year from date of shipment.

As a truck purchaser, you should accept nothing

A one-year warranty assures you that the manufacturer has complete confidence in the materials and workmanship that go into his product. It gives you twelve months protected operation of the truck *under your conditions*—allowing ample time to detect imperfections, which might not show up during a 30,60 or 90 day guarantee period.

Baker Trucks have a half-century reputation for outstanding performance, long life and low maintenance. For example: a fleet of the first Baker ram trucks ever built is still in service at a large midwestern steel mill after 32 years!

Let a Baker handling engineer give you the full story, or write for Bulletin 54B. The Baker-Raulang Company, 1227 West 80th Street, Cleveland 2, Ohio.

Subsidiary of Otis Elevator Company



582

fatigue cracks

by William M. Coffey

Are you a trout man?

Bluefish? Channel Cat? Prefer goggle-fishing? Perhaps you're happy with a string, bent pin, and a bamboo pole.

Since the Stone Age, fishermen have had different ideas about which fish will bite, where, and why. Today the big change in fishing is that what once was all work, a method of getting food, has developed into a recreational art. Hundreds of years of study have given us a wide knowledge of the species, manners, and migration of fishes.

And soldiers of the U. S. Army all over the world are taking advantage of that knowledge.

From Chesapeake Bay to Honolulu, from Scotland to Sicily, soldiers grab rods and reels, goggles and spear guns, bait, hooks, lines, leads, and flies. They pile in boats, dive from coral reefs, and nap by river banks. By the hundreds, in all seasons, in nearly every country, Army men have "gone fishing!"

Major Marjorie W. Kempf, WAC Hqs. Flerkville Military District

Dear Marge:

Thank you very much for sending me the above recruiting literature about the new army. And I hasten to tell you that it was all a mistake about me wanting to quit the reserves. I am very sorry, too, that I gave you so much trouble in the past year on this thing. Of course, I don't want to quit. It was all a big mistake and I apologize for not answering your letters from the Colonel telling me about the nice meetings and physical exams you were having and if you will just send back all those papers with the places in them where I sign I will rush them right back to you.

Marge, I want you to know, too, and I know you'll believe me, that I didn't mean a word of it in my last letter-the one where I said all you were teaching me was how to salute again and how to call on the Colonel's wife and that you got my records all mixed up and that I didn't think the army was any place for women anyway. I was real sick at the time. Marge. and didn't know what I was saying. I know you'll understand, Marge. I was real sick. Write my wife. She'll tell you what a fool I was, Marge.

I am enclosing the big piece of paper that says at the top "Discharge" and I hope you'll cancel this right away. About rank, if I can't have my old rank back that's perfectly OK. Just any old rank will do.

I just bought a new trout rod, with one of those new non-snag reels and I'm very anxious to try it out so if there's anything you can do to speed this along I'll be very grateful, Marge.

And will you please say "hello, sir." to the Colonel for me?

Very truly yours, Caleb Flerk,

Acting Corporal, USAR

*Hasn't the new T/O come in yet, Marge? I thought you'd be a Lt. Col. months ago. Of all the officers at good old Hqs. you deserve it most, sir.

Puzzlers

We have a confession to make. Gee, we don't know, haven't had the time to figure out, just how long it took Caleb to fly to Ezra's house. But we suspicion it took 87½ minutes. Nobody agrees with us except the author of the puzzler, Rusty Corley. Those who disagree follow: C. W. McKinley; Ralph Foose, Muskegon Tool & Die Co., and George Pason.



Now, over 3,000 presses, lathes, etc. are installed on

AIR-LOC is the *only* machinery mounting method that gives you all these advantages:

- You just sit the machine on AIR-LOC.
- You don't need cement, bolts or other fastening devices.
- You reduce transmitted machine noise and vibration up to 84%.
- You start machine right away no waiting for cement to dry.
- You can re-use AIR-LOC because it is not cemented, does not "pad down".
- You can mount up to 72 tons per sq. ft. on AIR-LOC with absolute safety.

Every order shipped same day received.

FREE BODX TELLS ALL

AIR-Lec Division
Clark, Cutler, McDermott Co.
Franklin Mass.
Please send the booklet describing patented AIR-LOC to:

HAME (PLEASE PRINT)
COMPANY
AERERES
CITY ZONE STATE



THREE SIZES OF TUBING IN ONE PUMP ... PRECISELY!

Like so many products, the deep well reciprocating pump manufactured by Fluid Packed Pump Company of Los Nietos, California, is practically all tubing with the exception of fittings used on the end. And because the pump's components are received as tubes—semi-finished products in themselves—they require much less fabrication than would otherwise be necessary.

For the past 10 years, this company—an acknowledged leader in its field—has used B&W seamless alloy steel mechanical tubing for its product which pumps oil up from subsurface areas of wells. The barrel and plunger of the pump are precision parts which must be held to extremely close tolerances if they are to function properly. The uniform size, wall thickness and concentricity characteristics of B&W Tubing, with its surfaces free from spiral, scratches and pits, combine to make this tubing ideally suited to the Fluid Packed Pump operation.

A closer look at your own product, from both a design and fabrication standpoint, may reveal opportunities for tubing applications that may save time and money and improve your product. Whatever your requirements, B&W Tubing—carbon, alloy or stainless—can meet them. Call Mr. Tubes, or write for Technical Bulletin 365. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.



Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels

dates to remember

MARCH

FARM EQUIPMENT INSTITUTE—13th industry-research conference, March 28-29, Cornell University, Ithaca, N. Y. Society headquarters, 608 S. Dearborn St., Chicago.

EXPOSITIONS

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW-Oct. 8-12, Cleveland.

APRIL

MATERIALS HANDLING INSTITUTE— Spring meeting, April 3, Edgewater Beach Hotel, Chicago. Society headquarters, 313 Clark Bidg., Pittsburgh.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION, INC.—Annual spring engineering conference, April 4-6, Lehigh University, Bethlehem, Pa. Society headquarters, 101 Park Ave., New York.

AMERICAN SOCIETY OF LUBRICA-TION ENGINEERS—Annual meeting and lubrication exhibit, April 4-6, William Penn Hotel, Pittsburgh. Society headquarters, 84 E. Randolph St., Chicago.

NATIONAL SCREW MACHINE PROD-UCTS ASSN.—Annual business meeting, April 4-7, Hotel Schroeder, Milwaukee. Society headquarters, 1010 Euclid Bidg., Cleveland.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS —Annual conference, April 9-11, Netheriand Plaza Hotel, Cincinnati, O. Society headquarters, 29 W. 39th St., New York.

METAL POWDER ASSN.—12th annual meeting, April 10-12, Cleveland Hotel, Cleveland. Society headquarters, 420 Lexington Ave., New York.

NATIONAL ASSN. OF ARCHITEC-TURAL METAL MANUFACTURERS—Annual convention, April 12-17, Belleview-Biltmore Hotel, Belleair, Fla. Society headquarters, 7209 Cedar Ave., Washington, D. C.

ENVIRONMENT EQUIPMENT INSTI-TUTE—Annual meeting, April 19-20, Sheraton Hotel, Chicago. Society headquarters, 6420 W. Howard St., Chicago.

MAY

NON-FERROUS FOUNDERS' SOCIETY
—Annual meeting, May 3, MariboroughBlenheim, Atlantic City, N. J. Society
headquarters, 192 N. Clark St., Chicago.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS —1956 Pacific Northwest regional conference, May 3-5, Olympic Hotel, Seattle. Society headquarters, 29 W. 39th St., New York.

METALWORKING

bids for top industrial place in

NORTH CAROLINA

Outstanding in the industrial diversification picture of North Carolina is metalworking, represented by companies making a variety of products.

The rapid over-all industrial growth of North Carolina has created an important market right at hand for producers of instruments, machinery and many other products of metal processing. With more than half the population of the country within overnight reach, North Carolina metalworking companies have advantageous access to the national market.

Abundant labor is available with proven ability to acquire new skills in a surprisingly short time. Experience records show exceptionally low absenteeism, turnover and accident rates.

Business development foundations in sixty-one communities are prepared to erect buildings to meet the specifications of incoming and expanding industries.

Desirable plant sites, urban and rural, are available in the mountain, piedmont and coastal regions of North Carolina.

Send for already-prepared briefs on any special location in mind or an all-state "Industrial Location Factors" brochure.

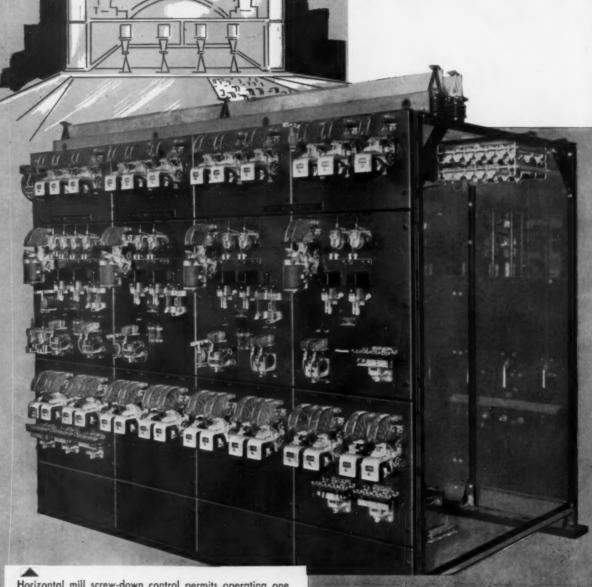
DEPARTMENT OF CONSERVATION & DEVELOPMENT

Raleigh 11, North Carolina

Governor Luther H. Hodges, Chairman of the Board

STEEL MILL AUXILIARY CONTROL

Engineered ALLIS-



Horizontal mill screw-down control permits operating one motor for two screws through clutches. Horizontal mill housing adjustment panel is a reversible dynamic braking controller. Vertical mill roll adjustment panels permit operating two motors in unison or individually.

ALLIS-

THE IRON AGE

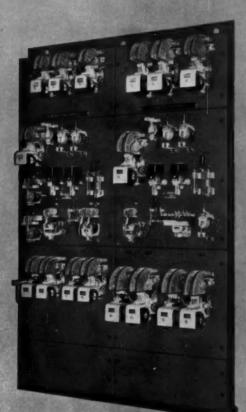
and Built by CHALMERS

Installed in some of the nation's largest mills, these Allis-Chalmers mill auxiliary controls are providing smooth, precision performance... affording maximum production with a minimum of outage time and maintenance.

When you modernize or expand, take advantage of Allis-Chalmers experience and engineering skill in building steel mill control. For further information see your Allis-Chalmers representative or write Allis-Chalmers, Milwaukee 1, Wis.

A-4744



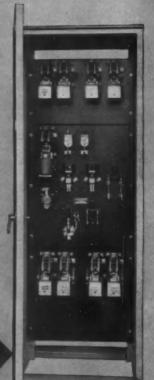


Motor control for hydraulic feed pumps. Non-reversible with field accelerating and field decelerating relays.

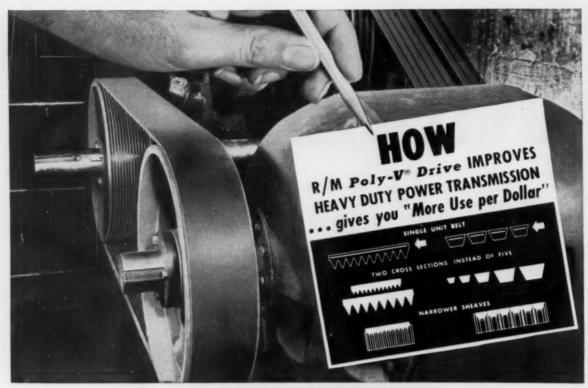
Two reversible controllers with dynamic braking and series brake for an upcut sheer and shear pinch roll.

Reversible dynamic braking controller for roll conveyor. Operates at two speeds in either direction.





CHALMERS



R/M **Poly-V**° **Drive**"Trouble-Proofs" this Mine Fan Drive!

Less shaft overhang . . . less drive weight . . . less bearing load! The exclusive features of patented R/M Poly-V* Drive eliminated the primary causes of belt failure on the mine fan drive pictured above. Overheated bearings—even a broken jack shaft—threatened the supply of vital fresh air to an underground mine until engineers replaced the former drive with a new R/M Poly-V Drive with its space-saving, lighter weight. It's a new concept in heavy duty power transmission.

Unique design reduces the width of Poly-V Drive to only two-thirds to three-quarters that of standard multiple V-belt drives of the same capacity. That's because Poly-V Drive employs a single, endless parallel V-ribbed belt running on sheaves grooved to mate precisely with the belt ribs. Uniform pull of this single unit belt distributes drive load evenly over the entire width of the sheave... gives higher horsepower capacity per inch of drive width. No other belt drive can deliver as much power in as little space!

Poly-V Drive's "single unit" belt design also eliminates

stretching and V-belt "matching" problems. Uniform power delivery and drive dependability is *not* limited to individual V-belt life. Speed ratio is constant. Costly belt and sheave inventories are reduced to a new low because just *two* cross sections of Poly-V meet every heavy duty power requirement.

R/M engineers are ready to help you improve your belted drives . . . get "More Use per Dollar" . . . with R/M Poly-V Drive. Contact R/M . . . or write for a copy of Poly-V Drive Bulletin #6638.

CONDOR V-BELTS . R/M SUPER-POWER V-BELTS

Write for Bulletin #6868 on the complete line of Condor V-Belts for regular service on conventional V-belt drives. Also write for Bulletin #6628 on R/M Super-Power V-Belts with 40% more Horsepower capacity where needed.



*Poly-V is a registered Raybestos-Manhattan trademark.

RM-607



MANHATTAN RUBBER DIVISION - PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.







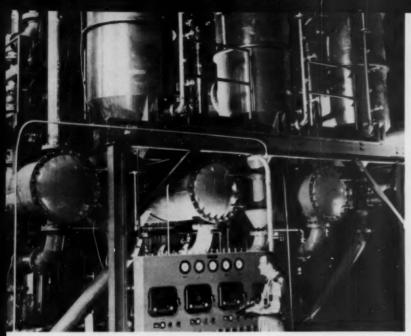








Other R/M products include: Industrial Rubber * Fan Belts * Radiator Hose * Brake Linings * Brake Blacks * Clutch Facings Asbestos Textiles * Packings * Engineered Plastic, and Sintered Metal Products * Laundry Pads and Covers * Bowling Balls



FOR CORROSION RESISTANCE. The Marathon Corporation developed a method of producing lignosulfonates from paper mill sulfite liquor, but it was impractical until Stainless Steel became available in the 1930's. The plant now produces 75 million pounds a year, and 50% of the equipment is Stainless Steel.

NOTHING can equal Stainless Steel

 No other design material can match Stainless Steel in its combination of desirable properties: corrosion resistance, strength and hardness, beauty, cleanability and easy fabrication. When buying Stainless, remember that United States Steel offers the widest range of types, finishes and sizes available in the United States.

UNITED STATES STEEL CORPORATION, PITTSBURGH . AMERICAN STEEL & WIRE DIVISION, CLEVELAND COLUMBIA-GEREVA STEEL DIVISION, SAM FRANCISCO . RATIONAL TUBE DIVISION, PITTSBURGH TEMBESSE COAL & IROD DIVISION, FAIRFIELD, ALA.

UNITED STATES STEEL SUPPLY DIVISION, WAREHOUSE DISTRIBUTORS

USS STAINLESS STEEL

SHEETS · STRIP · PLATES · BARS · BILLETS
PIPE · TUBES · WIRE · SPECIAL SECTIONS



FOR ENDURING BEAUTY. This great religious symbol is erected on the grounds of St. Patrick's Academy, Chicago, Ill. The Stainless Steel skin furnishes a gleaming, permanent inspiration to all viewers.



FOR WET, ABRASIVE SERVICE. Here's a Stainless Steel shaker screen in a coal plant. Management says, "Ordinary screens would only last about two weeks, but we can expect three years of service from these Stainless Steel screens..."

SHITED STATES STEEL

"It was a ticklish job — shrink-fitting the world's largest plate mill roll"

says Harry Brinker, Asst. Division Supt.,

Homestead Forgings Division

Although he has spent over 40 years in the forge shop, even Harry Brinker was impressed with, and proud of the arbor sleeve back-up roll shown here. It is being shipped to Ruhrstahl AG., a large German basic steel producer.

The arbor is about 29 feet long and 4 feet in diameter. It is a USS Quality Forging, heat treated and machined. Encasing this arbor is the roll body, a sleeve about 13 feet long and 6 feet in diameter. This also is a USS Quality Forging, heat treated and machined. The complete roll weighs 121 tons.

The steel is nickel-chromium-molybdenum-vanadium alloy, heat treated to 52 Shore for the arbor, and 60 Shore for the sleeve. But the tough part of this job was the shrink fit. Both pieces had to be machined with great care. Then the outer piece was heated and slipped over the arbor, using carefully developed techniques to position it exactly before it cooled and shrank to form an inseparable bond with the inner piece. In fact, it was U. S. Steel's unique experience with this type of fabrication that led Ruhrstahl to come 4,000 miles for this roll—the largest of its type ever produced.

USS Quality Forgings are discussed in a booklet that is free upon request. Please address inquiries or requests for the booklet to United States Steel Corporation, Room 5252, 525 William Penn Place, Pittsburgh 30, Pa.

FORGINGS



heavy machinery parts . . . carbon, alloy, stainless forged steel rolls and back-up roll sleeves

electrical and water wheel shafts

specialty forgings of all types

UNITED STATES STEEL







"We've found that refractory concrete furnace walls like this have a better K insulating value than conventional masonry walls," reports masonry super-intendent Floyd Colledge, Homestead Works, United States Steel Corp., Munhall, Pa. Packaged castable used on this job: Laclede-Christy's "Steel Cast."

50-foot furnace side walls still like new after 4 years of service at 2200°F.

"We build our long furnace walls of anchored refractory concrete for greater stability and increased resistance to thermal stresses and strains," reports masonry superintendent Floyd Colledge. "Some of these refractory concrete walls have been in service over 4 years and are still in excellent condition."

Refractory concrete furnace walls made with Lumnite* calcium-aluminate cement or Lumnite-base castables can save time and money in your plant, too. Construction is fast and easy—just pour refractory concrete in simple wooden forms. No costly fitting at joints or around portholes. And refractory concrete made with Lumnite reaches service strength within 24 hours!

You'll find many other uses for refractory concrete made with Lumnite. And you can make refractory concrete designed for your specific job by just adding water to a factory-prepared castable mix. Keep a supply of Lumnite cement or Lumnite-base castables on hand for emergency needs. Castables are made and distributed by leading manufacturers of refractories.

UNIVERSAL ATLAS CEMENT COMPANY

UNITED STATES STEEL CORPORATION SUBSIDIARY

100 PARK AVENUE, NEW YORK 17, N. Y.

Albany · Birmingham · Boston · Chicago · Dayton · Kansas City · Milwankse

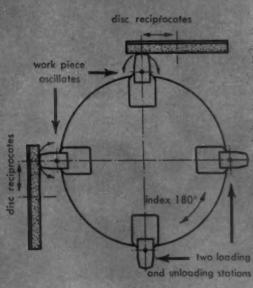
Minneapolis · New York · Philadelphia · Pittsburgh · St. Louis · Waco

*"LUMNITE" is the registered trade-mark of the calcium-aluminate cement manufactured by Universal Atlas Cement Company.

Atlas Lumnite Coment

FOR INDUSTRIAL CONCRETES
REFRACTORY + INSULATING + OVERNIGHT + CORROSION-RESISTANT





Job Data

Gardner No. 742-42" Grinder. MACHINE

TOOLING Hydraulic work table automatically indexes and fixtures oscillate work across

discs. Work is hydraulically clamped.

PART Rock bit heads ranging from 31/8" to 15" in size; steel forgings.

OPERATION Grinding radius on heads.

Up to 5/16"—in one cycle. STOCK REMOVAL

> Two Gardner 42" Yellow Rim WIRE-ABRASIVES LOKT Discs.

precision disc grinders

BELOIT, WISCONSIN

3 Basic Reasons Why

ALCO STEEL RING FORGINGS

are Better







SAVINGS IN MACHINING COSTS-

Most machining operations can be simplified or eliminated entirely.

SAVINGS IN MATERIAL-

Shellcast parts can be poured to dimensional tolerances of plus or minus 0.010" per inch. Sections less than 1/8" can be Shellcast. Tremendous savings in material are made possible.

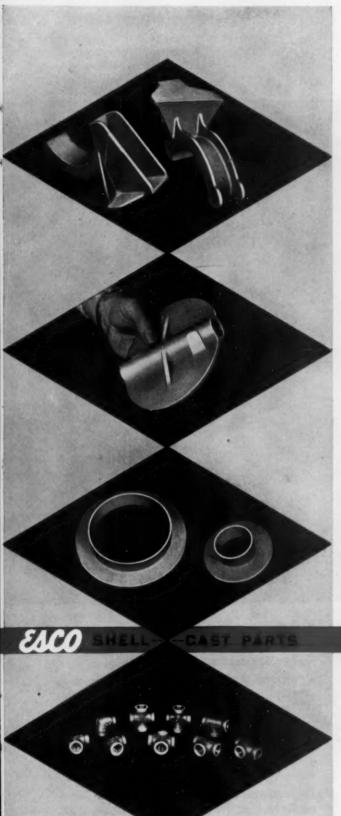
ILLEPANOVE VOIDE PRODUTES THE STREET

SMOOTHER SURFACE - BETTER APPEARANCE

if desired, castings may be buffed to satin or bright finishes without prior machining. You get a better looking, more saleable product.

GOOD REPRODUCTION OF DETAIL-

Shellcast often reproduces lettering so well that a separate nameplate is no longer needed. Intricate details of design, defying normal foundry mothods, can be Shellcast successfully.



IS A NEW CASTING TECHNIQUE ...

that not only produces parts better, faster and at lower cost, but often makes substantial savings in basic production procedures. Smooth surfaces, with good reproduction of detail; uniform density, light weight . . . these are only a few Shellcast advantages that bring savings in materials, machinefinishing, and assembly. ESCO Shellcast is available in all low alloy steels, stainless steels and high alloys.

WRITE FOR
FREE BOOKLET
"CUT PRODUCTION COSTS
WITH
ESCO SHELLCAST"



ELECTRIC STEEL FOUNDRY CO.

2184 N. W. 25th AVENUE, PORTLAND, OREGON

- () Send me a free copy of "Cut Production Costs With ESCO Shellcast".
- () Have an application engineer call for an appointment.

Company

Company

Address

City__

State

the first name resistance welding

In his lifetime, Elihu Thomson amassed the astounding total of 700 patents, many of which profoundly influenced developments in almost every field of industry.

Perhaps his most notable invention is resistance welding. Basic patents were applied for in 1886 shortly before he founded the Thomson Electric Welder Company.

Since then, the Thomson company has continued to pioneer in the development of resistance welding equipment and is largely responsible for making the process the economical and widely applicable production tool it is today. Recent Thomson contributions to the art of resistance welding include:

- Development of high-production standard spot, projection and seam welders.
- "Synchro-Matic" flash welding which opened up entirely new fields of non-ferrous as well as ferrous metal joining.
- Application of automation and precision control to all types of resistance welders.
- Fabric welders, brake shoe welders and other specialized equipment.

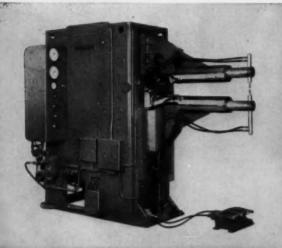
Thomson men are strategically located in all metalworking centers. We welcome an opportunity to discuss your resistance welding problems with you.

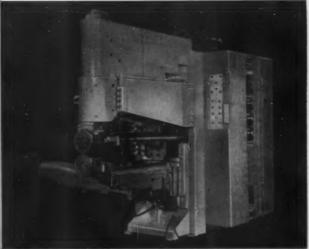
SPOT AND PROJECTION WELDERS

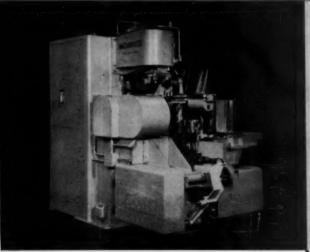
The Thomson line is complete ranging from bench welders to heavy duty presses. The machine shown below is an air operated rocker arm aircraft spot welder.

SEAM WELDERS

Sizes range from 50 to 400 KVA including models for circular or longitudinal seaming or universal machines such as the model shown which handles both types.









SPECIAL PURPOSE WELDERS

Many Thomson special designs have become standard equipment in their fields of application. This is a Thomson brake shoe welder with automatic web feed.

"SYNCHRO-MATIC" FLASH WELDERS

An exclusive Thomson development for flash-butt welding ferrous or non-ferrous metals. The Model F3 Synchro-Matic shown is tooled for miter welding window frames.

VISIT BOOTHS 118-119



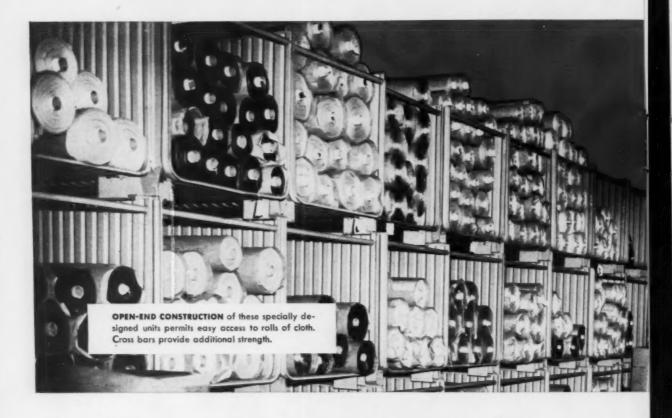
BUFFALO, N. Y., MAY 9-11



THOMSON Welders

INVENTOR OF RESISTANCE WELDING

THOMSON ELECTRIC WELDER COMPANY, LYNN. MASS.



This Special Republic Equipment A HANDLING PROBLEM and

Here's another example of how the experience, designing ability and fabricating versatility of Republic's Pressed Steel Division paid off in a simplified handling system that reduced costs.

United Piece Dye Works, Inc., of Lodi, New Jersey, had a difficult problem involving the handling, transporting and storing of large-diameter bolts of cloth.

United received the cloth "in the gray" as it came from the looms. After dyeing, bleaching or printing, the rolls of finished goods were stored in bins in the company warehouse and were parceled out in varying amounts as customers requested them. Each request required numerous and costly handling operations.

Republic Materials Handling Engineers, called in to work on the problem with United Engineers, developed the special units shown above. Now, instead of handling only one bolt at a time, numerous bolts can be stored, handled and transported quickly and easily in each unit. The entire operation is greatly simplified and cost reduced. But, these are only initial benefits. Design and

REPUBLIC



World's Widest Range of Standard Steels



SIMPLIFIED CUT COSTS

construction features of all Republic Materials Handling Equipment assure long service life at lowest per-year cost.

What about your plant? Perhaps a specially designed unit could cut your costs or simplify an operation. Republic engineers are available to help you design a unit to meet your specific needs. There's no obligation. Contact your Republic Materials Handling Equipment Dealer. Or write us. Visit our booth at the Material Handling Institute's Exposition, Cleveland, Ohio, June 5th thru June 8th.

STEEL

and Steel Products



REPUBLIC ALLOY STEEL CHAIN SLINGS SIMPLIFY HANDLING of heavy parts, machinery, etc., and at the same time provide an exceptionally high degree of safety. Republic Alloy Chain is more than twice as strong as low carbon chain of the same size. Republic's Bolt and Chain Division also makes chain slings in High Test Steel and Wrought Iron. They are supplied in any length and are proof tested and warranted to meet or exceed specifications.



REPUBLIC STEEL PALLET RACKS SIMPLIFY PALLETIZING and stacking of bulky, uneven, odd-lot and fragile materials. Tubular steel supports adjust every six inches to handle palletized material of any height. Two-way entry permits loading and unloading from either side. Select single pallets from any level without restacking. Write for complete description, specifications and quotations.

REPUBLIC STEEL CORPOR. Dept. C-1375 3104 East 45th Street Cleveland 27, Ohio	Allon
☐ I am interested in more informa Handling Equipment. ☐ Have a Materials Handling Eng	
Send additional information on:	☐ Chain Slings ☐ Pallet Racks
Name	Title
Company	
Address	
CityZone_	State

If you want only the best

... EXAMINE THESE REASONS

why leading extruders use

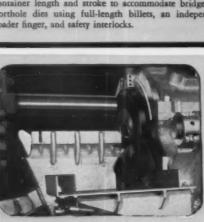
LAKE ERIE PRESSES

EXPERIENCE AND REPUTATION

Lake Erie Engineering Corporation is recognized throughout the world as the only volume designer and builder of hydraulic presses, die casting machines, and extrusion presses as well. Rugged, low stressed construction, dependable operation, incorporation of latest design features—all have become the hallmark of Lake Erie equipment. As a result of its research and development efforts, Lake Erie built the first presses for the commercial cold extrusion of steel and pioneered in the development of one of the first U. S. presses for the hot extrusion of steel.



Container holder, designed to maintain alignment regardless of thermal expansion, gives longer tool life and higher quality extrusions. Billet loader, mounted on container holder, saves time by permitting loading cycle to start while previous billet is being extruded. Rotary die slide speeds die changing and provides clear view through die for inspection and cleaning. Automatic cycling cuts non-extrusion time. Other beneficial features include runout opening machined for carbon canister, sufficient container length and stroke to accommodate bridge-type porthole dies using full-length billets, an independent loader finger, and safety interlocks.

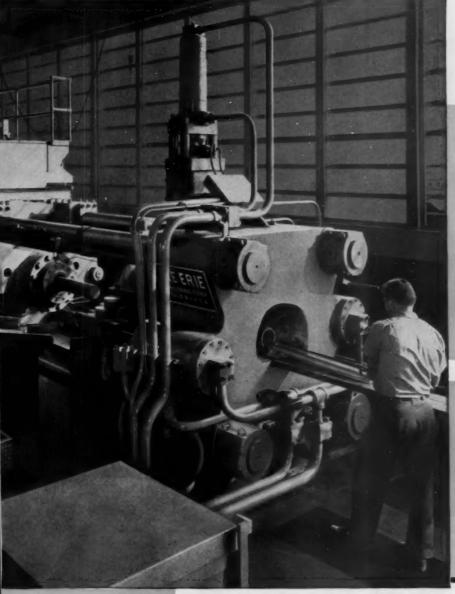


Billet Loader, mounted on container holder, speeds loading.

Patented Rotary Die Slide speeds die changing, simplifies inspection and cleaning.



in EXTRUSION equipment



RESPONSIBILITY AND SERVICE

Your Lake Erie press will be assembled and fully tested in our shop. Our service organization will install, start up and test the equipment in your plant, and instruct your personnel. The most complete operations and maintenance handbook will be furnished. And, if you wish, we will arrange for the complete installation including stretchers, billet heaters, conveyors and other related equipment.

TYPICAL USERS

who have bought from one to five Lake Eric presses: Allegheny Ludium Steel Corp.

Harvey Aluminum Co.
Hunter-Douglas Aluminum Corp.
Hokin Aluminum Co.

Bohn Aluminum & Brass Corp.

Ludman Corp.

Macklanburg-Duncan Co.

Reynolds Metals Co.

Revere Copper & Brass, Inc. Texas Aluminum Co.

A 1400 ton aluminum extrusion press and complete auxiliary equipment recently installed by Lake Erie for Stanley Building Specialties Company.

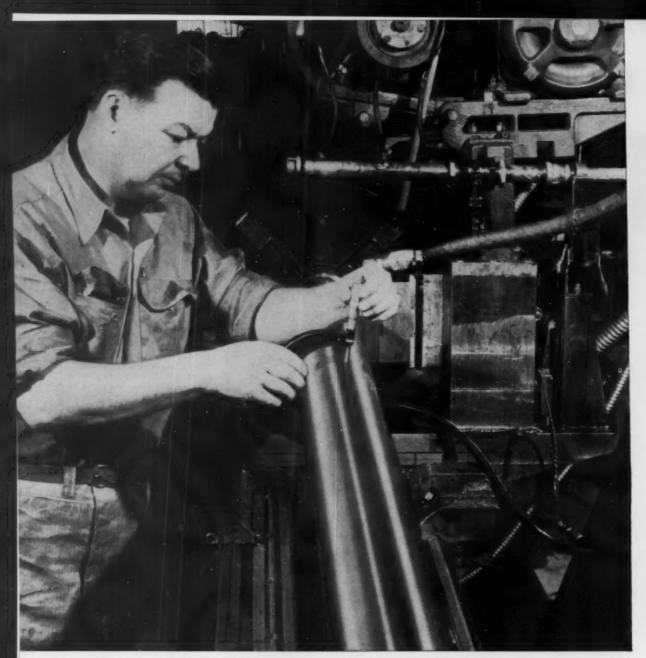
LAKE ERIE

ENGINEERING CORP. BUFFALO. N.Y. U.S.A.

LAKE ERIE ENGINEERING CORP.

General Offices and Plant: 368 Woodward Ave., Buffalo 17, N. Y. District Offices in New York, Chicago, Detroit, Pittsburgh Representatives in Other U. S. Cities and Foreign Countries

Manufacturers of die casting machines and the most complete line of hydraulic presses for all industry



Freedom from deep surface defects scores a point for Pittsburgh tubes. Absence of defects holds down rejects, speeds up production.

Steel That Stones Polish

Pittsburgh Steel Tubes Help Ohio Honing Establish Unusual Claim— Firm Hones Hydraulic Cylinders With No Preliminary Machining

Al Blewett, president of the Ohio Honing & Hydraulic Company, proudly claims his Cleveland, Ohio, plant is one of the few in the country where seamless mechanical tubing is honed internally and externally without first being bored, ground or turned.

The details of his technique and

special equipment are Mr. Blewett's secret—but he is quick to say that quality tubing from Pittsburgh Steel Company plays an important role.

Ohio Honing, which makes a specialty of honing, uses Pittsburgh tubes to make cylinders for air and hydraulic cylinder customers throughout the United States and

Canada. The company processes tubes for some customers and also produces complete air and hydraulic cylinders for other customers to their specifications.

Ohio Honing makes cylinders as small as 6 inches long while its largest cylinders measure up to 30 feet long. The 6-inch cylinder has an in-



Internal Honing. The operator is removing .045 inch from this $7\frac{1}{2}$ inch I.D. Pittsburgh tube. The tube is $58\frac{1}{2}$ inches long and has a wall thickness of $\frac{3}{8}$ inch.



Before and after internal and external honing. Al Blewett, president of Ohio Honing, left, checks a finished tube with Office Manager Kenneth Sherman.

side diameter of one inch and the 30foot cylinders have a 24-inch inside diameter.

Mr. Blewett declared the consistent high quality of the seamless mechanical tubing made by Pittsburgh Steel is so important to his operations that he recommends them to customers for whom he does honing work only. Pittsburgh tubes also are his choice for cylinders which he starts and finishes in his own plant.

• Requires "Perfect Finish."
"We must have tubing without defects so that .035 to .045 inch honing will give us a perfect finish," declared Mr. Blewett. "Our scrap on tubes is very low because Pittsburgh Steel tubes are unusually free of defects."

Approximately 7,000 tubes pass through Ohio Honing's plant every month. Many of them get both internal and external honing. Yet the number of scrapped tubes is negligible.

That low rejection rate makes Pittsburgh tubes a prime favorite with Ohio Honing. Mr. Blewett also gives them a high score on concentricity, straightness, and weldability on automatic welders.

"And we can get the tubes we want in standard sizes which are readily available," he pointed out.

Excellent performance in produc-

tion and high quality in the finished product are assured when you use Pittsburgh tubes in your tubing application. Let Pittsburgh tubes prove

themselves on your production line.

Just ask a Pittsburgh Steel representative to call on you or write now for the new tubing handbook.

Pittsburgh Seamless Mechanical Tubing is also available from:

Baker Steel & Tube Company Los Angeles, California

Chicago Tube & Iron Company Chicago, Illinois

The Cleveland Tool & Supply Co.

Drummond McCall & Co., Limited Montreal, Quebec, Canada

Edgcomb Steel Company Philadelphia, Pennsylvania

Gilmore Steel & Supply Co. San Francisco, California

Earle M. Jorgensen Co.

Mapes & Sprowl Steel Co. Union, New Jersey

Metal Goods Corporation St. Louis, Missouri Miller Steel Company, Inc. Hillside, New Jersey

A. B. Murray Co., Inc. Elizabeth, New Jersey

C. A. Russell, Inc. Houston, Texas

Ryerson, Joseph T. & Son, Inc. Chicago, Illinois

Solar Steel Corporation Cleveland, Ohio

Steel Sales Corporation Chicago, Illinois

Tubular Sales Detroit, Michigan

Ward Steel Co.
Boston, Massachusetts

Ward Steel Service Company Dayton, Ohio

Pittsburgh Steel Company

Grant Building . Pittsburgh 30, Pa.

District Sales Offices

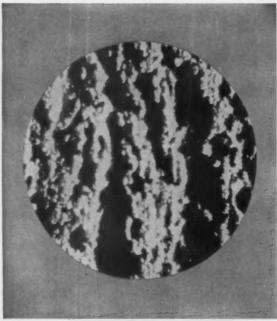
Atlanta Chicago Cleveland Columbus Dallas Dayton Detroit Houston Los Angeles New York Philadelphia Pittsburgh San Francisco Tulta Warren, Ohio



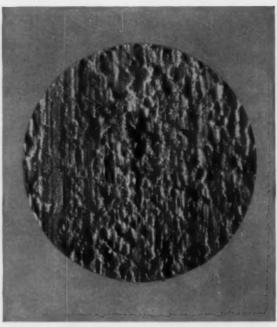
HOW RODINE CUTS PICKLING COSTS

Results demonstrate the effectiveness of Rodine° in retarding the attack of acid on the metal

Rodine pickling acid inhibitors, when added in small quantities to acid pickling baths, retard the attack of the acid on the metal without affecting its ability to remove scale. Their effectiveness in saving acid and metal is best demonstrated by this simple comparison.



Effect of Uninhibited Acid on Steel This microphotograph shows a piece of steel which was pickled in an uninhibited acid for 5 hours. Note the deep pits and the crystalline character of the surface of the metal.



Effect of Rodine Inhibited Acid on Steel This steel was pickled exactly like the other piece, but with Rodine added to the acid solution. Only scale pockets and roll marks are visible; no pitting occurred.



A typical strip pickling installation. Rodine prevents overpickling even during line shutdowns.

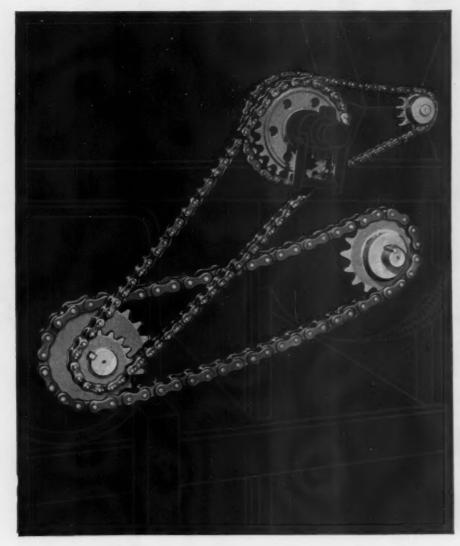
In straight line pickling of wire, rod and tubing, Rodine makes available more metal for drawing. In batch pickling, Rodine improves the surface. In continuous strip pickling, Rodine prevents overpickling during line shutdowns. Wherever it is used, Rodine saves acid and metal. Our treatise on pickling and the use of Rodine, "Efficient Pickling with Rodine," gives full information. Write for your copy today.

AMERICAN CHEMICAL PAINT COMPANY Ambler 20, Pa.

DETROIT, MICHIGAN . NILES, CALIFORNIA WINDSOR, ONTARIO



In roller chain ... EXTRAS* like these give you extra reliability

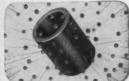




LOCK-TYPE BUSHINGS (applied on a range of sizes) end a cause of stiff chain.



PRE-STRESSING of multiple width chain provides uniform load distribution.



SHOT-PEENED ROLLERS have greater fatigue life, added ability to withstand impact.



CLOSER HEAT-TREAT CONTROL — coupled with rigid testing insures uniformity.

*And you pay no premium for these LINK-BELT extras

B is reason why Link-Belt Precision Steel Roller Chain is first choice for so many tough jobs is that it has extra reliability built-in. For example, pre-stressing smooths out any irregularities of multiple width chain in advance. And it's just one of many extras you get as standard from Link-Belt. Check the three others shown here. Then call the Link-Belt office or authorized stock carrying distributor near you for facts on Link-Belt's complete range of roller chain and sprockets. Data Book 2457 gives full information on single and multiple widths, in ½" to 3" pitch, 1" to 3" double pitch. Ask for your copy.



ROLLER CHAIN & SPROCKETS

13,702

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Austria, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World.



WHEN AUTOS CAME IN ONE COLOR

Hard to believe, isn't it, that the "last word" in the autos of our youth are now museum pieces. The automotive industry has drastically changed our mode of living and today is meeting the challenge of an apparently insatiable public demand for higher standards of design, power and comfort in personal transportation. Many of the advances in car design and performance have been made possible by improved steels. Working with automotive manufacturers to provide the *right* steels has been one of the important jobs at Inland for many years.

INLAND STEEL COMPANY 38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansos City, Indianapolis, Detroit, New York. Steel products supplied to the automotive industry include hot and cold rolled sheets and strip, bars, plates, structurals, 4-Way safety plate. Other products: tin mill products, Ti-Co galvanized sheets, reinforcing bars, rails and track accessories, coal chemicals.



NEWSFRONT

Got More Than Expected

There's at least one Midwestern manufacturer who doesn't believe that new and expensive equipment installations always represent the "last word" in efficiency. Just three years after installing a new tube mill, the equipment is (1) running at one-third higher speed than it was designed for, (2) producing quality heavy wall tubing for which it was not intended, (3) operated by five men compared to the eight considered the rock-bottom on manpower.

Common Failure Tough To Predict

The most common type of failure—fatigue—is also the toughest to predict. But a recent test program provides what may prove to be the simplest answer to avoiding fatigue before it occurs. Reduced to capsule form, it is the "one good stress offsets an even greater stress" approach. By properly understressing metals prior to service, it is now possible to condition these materials in a way that will increase both fatigue limit and fatigue life.

No Way Out For Shippers

Shippers who have been considering truck transportation as a result of the recent 6 pct increase in rail freight rates will be disappointed if they expected relief. Motor trucking rates in the Middle Atlantic region are due to go up about mid-April. Most items will be hiked 6 pct. Iron and steel products will be increased under a special schedule.

Challenge To An Old Grinding Theory

Will the grinding wheel with the finer grit size always produce the finer surface finish? Not always, reports a Japanese researcher. Cleavability of the grit and machine vibration are frequently overlooked factors. Because of them, a grit size finer than No. 80 has proportionately less effect than a coarser grit.

Machine Goes Underground

What's the answer when a firm needs a big machine tool for a critical but infrequent job, and

has neither the money nor floor space for it? One firm's solution: Design and build your own machine. In this case, the unit will be installed below floor level; the opening covered with steel plates to support other activities.

Administration Sees Advisors' Side

The Administration plans to swing hard in defense of businessmen asked to help run the government. First step, with all-out GOP congressional support, will be to repeal requirements that non-compensated advisors give detailed financial statements. Reason: It's getting tougher and tougher to get good men willing to bare their personal lives and run risk of being dragged over the political coals.

Scrap's Getting Tighter

There's growing pressure on steel scrap prices. Brokers and dealers are finding it tough to fill old orders at a profit, or even to come off without a loss. After reaching a peak in January, prices hit a period of weakness that continued through February. But prices have turned upward again. Dealer stocks are low, and large tonnages hard to come by.

Keep Your Eye On Middle East

Eruptions in the Middle East could spell serious trouble for America's metalworkers. Oil industry sources say the nation could probably squeak through on domestic, Canadian and South American production, but it'd be tricky going. Rationing would probably be in the cards, assuming that a Middle East war would stay there and not spread to endanger Caribbean supply routes.

One Step Above Rumor Stage

The Middle East may make big news in fields other than oil pretty soon. Reports of iron ore strikes in Yemen are now known to be more than just rumors. A delegation from there and other Middle East countries is expected to arrive in America for hush-hush talks about iron ore within the next few months.

FOR BASIC

Open Hearth and Electric Steel Furnaces

HARBISON-WALKER

MAGNESIA RAMMING MIXTURES



H-W C MIX Periclase (92% Magnesia) Made From High Purity Seawater

- STABLE—Excellent Volume Stability (shrinkage less than 1% when heated to 2910 F-ASTM C-113-46).
- STRONG-High strength over entire range of steel furnace temperatures accounts for its unusual resistance to erosion.
- DENSE-High density-low permeability.
- EASY TO USE—Cold rammed to finished contour of any hearth.
- ECONOMICAL-Provides durable monolithic hearths with low installation cost and increases furnace availability.



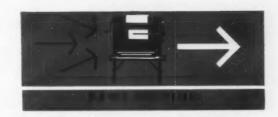
Made From Dead-Burned H-W MAGNAMIX Washington Magnesite—
Specially Sized—(80% Magnesia)

- VERSATILE—Dependable for new bottoms and especially adapted for both hot and cold maintenance jobs.
- HIGH MgO-Used without slag or scale additions, thus avoiding dilution of its high magnesia content.
- DURABLE—Excellent resistance to erosion accounts for its wide adoption as standard for repiping tap
- EASY TO USE—Superior properties for patching large holes in banks and bottoms. Applied by air-ramming, gun placement or by hand in hot patching.
- STRONG-Strong cold-setting with crushing strength of 1500 P.S.I.



HARBISON-WALKER REFRACTORIES COMPANY AND SUBSIDIARIES

> World's Largest Producer of Refractories GENERAL OFFICES: PITTSBURGH 22, PENNA.



PLANT GAMBLING: You Can't Beat the Odds

Organized gambling in your plant could be at the root of a drop in production efficiency . . . Lost job time, weakened supervisory authority are some results . . . It's a problem many companies face and solve.



◆ A FEW NICKEL and dime bets on the numbers never hurt anybody. Neither did a few outside calls to the neighborhood book.

Don't kid yourself. Plant gambling may be picking your company's pocket.

It could be at the root of decreased production efficiency.

It could rock your whole company loose from its moorings.

This isn't scare talk. A grand jury investigating the gambling situation at one company brought out that morale was low, production was lagging, and costs had risen to the point where it was difficult to compete with other plants.

As a company official analyzed the situation later, there was a direct time loss while men discussed and placed bets. It got so bad that the quitting whistle was less important than the announcement of the winning number. Men were ducking out to catch race results.

But more important, the company felt, there was a general weakening of authority. A foreman could not crack down on the job after winking at betting forms. If the foreman was taking hush money—and there were payoffs as high as \$30,000—the situation was that much worse.

There are other gambling evils not peculiar to the plant variety: discontent, distraction and theft due to losses—but strictly as a production factor, gambling slows work and weakens authority. Can you stop gambling? Yes, say companies that have faced up to the problem. By discharges, by posters, by indoctrination of guards and supervisors, realistic management groups have made it clear that they will not tolerate any form of gambling.

"It's like smoking in an oil refinery," said one industrial relations man. "You just don't allow it." First step is to see that supervisors and guards understand their responsibility in stopping gambling. Then, you publish your warnings against it. Then you act, discharging operators, disciplining players.

But won't you run into union trouble? Probably not. There have been cases of strikes against gambling discharges, but most unions today are cooperating with gambling drives. UAW has passed a resolution barring any member caught gambling from taking advantage of the grievance procedure.

At New York Shipbuilding

gambling moves in:

IN PERIODS OF OVERTIME
AND FULL EMPLOYMENT. WITH
INFLUX OF NEW WORKERS.
WHILE NEW CONSTRUCTION
IS GOING ON.
IF PLANT
IS LAX.



It's time to act when:

UNEXPLAINED PRODUCTION
LAGS COINCIDE WITH MAJOR
ATHLETIC EVENT.
WIVES OF EMPLOYEES
COMPLAIN ABOUT, TAKE HOME
PAY THAT DOESN'T GET THERE,
WAGE GARNISHEE ORDERS
MOUNT, RACING FORMS ARE
PREVALENT.

SPECIAL REPORT

Corp., Camden, N. J., management was able to plaster the yard with a union message denying protection to gambling offenders. Other companies advise that you get union opposition to gambling written into the contract and then quote from the agreement in your warning notices.

Will Police Help?

What about police help? In most communities today, police will do an effective job of cleaning out plant gambling rings. Last November, with the company's cooperation, Philadelphia police planted a rookie patrolman on a Philco Corp. production line. Within two weeks the man had been tapped by the plant numbers ring and assigned pickup duties. Shortly after, the police moved in, arrested four, picked up \$1,120 in cash.

In Wichita, police are right now in the process of dismantling a gambling ring that went into plants. In Kansas City, lawmen clamped the lid on a budding plant pool last football season. Other communities offer similar examples of the reform government that came in after the much publicized Kefauver hearings. Police will help but they emphasize they are powerless to act unless the company invites them in.

How do you detect plant gambling? According to one industrial relations man, large-scale gambling can't be missed. You find it, he said, by walking through the plant with your eyes open. Other authorities agree that gambling can't exist without the knowledge and consent of supervisory people.

Complaints by wives that paychecks are shrinking are one danger sign. President E. F. MacDonald exploded the Zenith Corp., Chicago, gambling ring after wives had written in about the bilking their husbands were getting.

Drops in worker output that can't be explained by any normal cause may indicate gambling activity. Other points to watch are unusual traffic at a nearby newsstand, a jump in wage garnishee orders and the appearance of scratch sheets or dream books.

What is the law on gambling? According to the laws of most areas, anyone who participates in unauthorized gambling is guilty. That includes intimate crap games or professional numbers operations. It includes player and operator. And the laws of most states authorize lotteries for only a few specifically-named organizations.

In practice, criminal prosecution is usually reserved for the professional operator. Reason for this: there aren't enough jails to hold the people who take an occasional or regular flyer. What type gambling goes on today? All types of gambling are found in plants but the numbers game or some variation probably gets the biggest play. The national syndicates had their wings clipped in 1951 and the breakup of Continental Press, Inc., left organized bookmaking without nationwide communications.

Numbers lotteries operated by local talent are the biggest plant menace today. But there is evidence that professional racket men are eyeing plant operations fondly. At one plant, tickets from a local lottery turned up miles away in the hands of a syndicate. The whole history of gambling probes is marked by a constant swallowing of local operations by the big mobs.

Can't Control It

Can't you have small, harmless gambling? No, say the authorities. Plant gambling is a big money thing and it produces the kind of money that buys trouble. At one East Coast company last year, there was a lottery known as the "Fifty-Fifty" club. Half the take went out in prizes; the other half went supposedly to a welfare fund.

This homey arrangement grew to the point where 18 draws were operating and the welfare fund was up around \$400,000. About this time the law was called in and the lottery stopped. Disposition of some \$250,000 in welfare funds was never made clear, but about this time, union members in very modest circumstances turned up as company stockholders. Equipped with high-priced lawyers, they brought a minority suit against the management. The move came as labor negotiations were underway, was termed a harassing action.

This may be an extreme case, but you always have the makings when 100 or 1000 men are playing games for money under the same plant roof. In the cleanup at Campbell Soup's Camden, N. J., plant in 1952, prizes of \$15,000 were being awarded. At 1951 hearings it was estimated the gambling play in Ford's Dearborn plant was \$3000 to \$4000 a day.

Steps to Stop Plant Gambling

- Get written agreement from union that it will not fight gambling discharges.
- Post warning notices prominently. Quotes from union contract help.
- 3. Establish responsibility of supervisory people and guards to stop gambling.
- 4. Keep security force out of main plant bargaining unit.
- 5. Enlist aid of police agencies in instances of active gambling.
- 6. Promote police action against nearby gambling centers.
- 7. Eliminate dark corners and congregating spots.

RADIO: Pocket Models Move into the Plant

Transistorized pocket pager works out in auto plant . . . Heavier radio equipment has already arrived . . . Rolling stock in some industries is nearly all radio-equipped . . . Small models gain—By K. W. Bennett.

◆ HERE COMES industrial radio again.

Two years ago heavy industrial sets (10 to 60 w output) scored a sales breakthrough and began moving out in substantial quantities into metalworking plants. This year, lighter equipment of the walkie-talkie variety, and even tiny 10 oz pocket units, is scheduled to begin selling in quantity.

Once the orphan of the radio industry, heavier radio equipment has arrived. The readi-mix cement industry, for example, is expected to have about 35 pct of its rolling stock equipped to receive radio messages from the mixing plant. It means a \$10 per day per truck cost savings. In 1956, the same sources figure, it's probable that this market will equip itself virtually 100 pct for radio dispatch

POCKET radio featuring tiny transistors makes busy production men and executives reachable at all times.

of readi-mix trucks, in the same manner that radio cabs and radio delivery trucks are controlled by a central office dispatcher.

Pocket Pager

Industry is pretty well sold on the value of privately operated radio transmitters. But while heavy equipment has been stepping out for two years, walkietalkie and pocket pagers weren't coming through.

First major indication of the break came with Motorola's transistorized pocket pager. Motorola has little to say about market prospects, mainly due to the natural desire to keep a good thing to one's self. The pager is transistorized, weighs 11 oz, receives one way calls from a telephone type switchboard.

In one plant the noise level is so high that the user is requesting the pager be equipped with a warning light to notify the wearer that he is about to receive a call, rather than the conventional buzzer with which the unit comes equipped. Motorola has already equipped all maintenance men in its home plant with pagers, will now equip all of its plants with the system. Installation costs: \$5-\$15,000; cost per pager, \$165; cost of the central switchboard, or "base station," \$800.

Others in Field

At least five companies produce a competitive product, RCA among them. After 1956 it's likely there will be more.

Walkie-talkie is going along. Walkie-talkie transceivers weigh from 8 to 40 lb, cost from \$125 to \$500 per unit. Transistors are part of the answer to the walkie-talkie sales boost, but not all.



SWITCHBOARD routes all calls and messages to intended recipients the same as with wire communications.

Hallicrafter's Little Phone, not yet transistorized, is enjoying an excellent sales prospect, though it's a safe bet that this company will announce partial transistorization of its walkie-talkie.

Light weight radio is moving into the same fields heavier transceivers were moving into two years ago. Freight yard switching (one road claims a 75 pct cutback in time required for car switching) is typical. Others are in ore mining, limestone mining, construction, dispatch of fork lift trucks. Illinois Bell uses them with telephone line repair crews and plant protection. The walkietalkie enjoys one advantage over heavier sets. Though its range is more limited than heavier equipment, the walkie-talkie can be easily moved from one vehicle to another by hand if necessary.

STEEL: Expansion Money Is a Problem

Steel managements face tough scramble for expansion funds . . . Big programs are off to a slow start . . . Structural steel and equipment needs are hard to get . . . Politics also part of picture—By Tom Campbell.

◆ THIS IS a year of decision for steel leaders. This is the year an answer must be found to the big question, "where is the money coming from to finance new capacity and replace old?"

Right now the answer is not clear cut. There may be some basic ideas about what it will be, but some hair-rasing problems are in store for the steel executive before the final and complete answer shows up.

The 15-million-ton-capacity expansion program is not far off the ground as yet. Probably less than 40 pct of the projects have been sealed with a firm commitment or order.

The serious part is that the longer it takes to place firm orders for equipment, furnaces, and material, the more chance there is for higher prices, disappointment in deliveries, and loss of competitive position.

Why is the expansion program off to such a slow start? Is it because steel makers do not know that their customers are sick and tired of recurrent periods of steel shortages? Can it be because some steel people want to keep capacity down in order to operate more often at close to the peak?

Projects Gather Dust

Or is it that same steel officials are blind to the future of the country and the dynamic growth in steel consumption over the long term? None of these reasons apply. The steel official who has done his homework — and most have—knows full well that increased capacity must come—and fast; and that when the present plan is completed still more capac-

ity will be needed. Steel officials lead in crying for this additional capacity.

But in the face of this array of fact and cold logic many steel projects for which money was appropriated a year or two ago are gathering dust. Other proposals are still far from getting the green light. There must be a good reason for this.

If steel leaders want more capacity and customers are clamoring for it, why isn't it coming at a faster rate? There are three major reasons involved in this picture—money; timing; and politics.

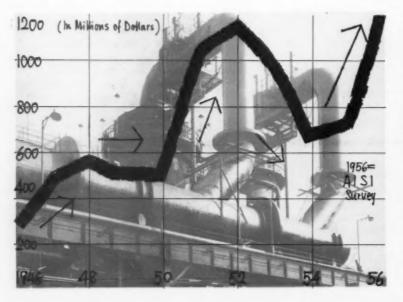
The truth is many steel companies today are worrying more about money for replacement and expansion than they are about the outcome of wage negotiations. Of the latter they have a fair idea. But where they are going to get amounts ranging from \$80 to \$350 a ton for new steel capacity is something less visible at this time.

But the fact is they must get the money—and stop worrying about it. That money will have to come from depreciation, earnings, higher prices and borrowing. The amounts are terrific. That commonly accepted statement that it will cost about \$3 billion for the current program of 15 million tons isn't far off. It may be more than that before the capacity is in place.

No Fast Tax Revival

Depreciation accounts are being used to the hilt. No more can be squeezed from them. There is little chance that steel firms can expect this year—at least—a more liberal depreciation plan. Recent cloak room talk to the effect that the fast write off plan for steel

What Steel Spends to Expand



would be revived is so much wishful thinking.

Steel companies have retained as much of their earnings as they could to pay for much needed replacement and additions. It is hardly likely that, at present prices, they can expect a windfall—especially after wage negotiations; unless the price increase more than makes up for the wage cost increase.

As to borrowing, there seems to be some kind of reluctance to sell stock on a scale large enough to button up this huge program. Since this program has to go through, it is a safe bet that institutional lending and some stock selling will have to be better explored as avenues of fund raising for steel expansion.

The steel industry has been one of the last groups to announce a major expansion program in recent years. It may not have been the fault of the industry, but the timing is also working against a crash program in steel expansion.

Machinery makers, electrical manufacturers and basic material suppliers were going overboard on new orders long before the steel industry picked up steam on its program. They still are.

The Political Angle

The timing also had other effects on steel. With steel demand at fever pitch, the need for steel for increased capacity alone takes $2\frac{1}{2}$ million tons for each 10 million tons of steel capacity added. This week some steel projects are being held up because the companies are unable to get plate or structural steel items.

Probably the least talked about factor in the steel industry's basket of headaches on capacity is the political one. It is no secret that most steel people are staunch Republicans. They want "their man" in another four—or forty years. Some of these officials had expected that Treasury Secretary George M. Humphrey would quickly and understandingly steer through a better and more realistic depreciation program. He didn't do it. Nor will he.

Mr. Humphrey can wear only

What Are The Steel Expansion Problems?

Major Problems:

It is money. Steel firms need cash and they need it quickly. The present depreciation accounts are not enough to support many of the expansion plans. Why? Because many of these plans call for ore, ships, furnaces, rolling mills and new buildings. As each year goes by more and more steel companies will be in the same position: bigger bills for more capacity. Even more serious: As time goes on replacement of existing over-age capacity will become a necessity. That's in addition to expansion.

Long Range Puzzlers:

Mills have to decide today what equipment is subject to change in the future and make plans for such changes. New equipment today is being installed so that nearby machinery not yet replaced can be pulled out without damaging the production cycle or efficiency. This ranks as a problem almost as serious as getting the money to pay for it. And the next ranking puzzler is: where do you locate your capacity 10 years from now?

one hat at a time. Right now it is the hat of a cost-conscious Secretary of the Treasury whose goal is a balanced budget and a fiscal way of life common to one and all. He can't see special treatment for any one industry at this time—or at any other time. And the time is not "propitious" to indulge in a large scale argument about a broader and more realistic depreciation formula "for all."

Customer Price Reaction

So the steel industry is not only short of cash—remember that surpluses are not carried in cash but in machinery and other assets—it is betwixt and between forces not of its own making. How long can it be expected to stay there? That's a question stockholders, customers and new investors would like answered.

The most immediate source for increased revenue — expansion-money—is via the price route. The cries of anguish from the can companies is only a sample of what the steel firms will hear when they boost prices high

enough to meet their individual wage costs and some of their expansion costs.

The answer to the "where-isthe-money-coming-from?" question grows a little clearer—if you assume that some steel firms will be able to go through and survive a battle of words and curses. No one is going to pay higher prices for steel stocks unless the earnings potential looks good.

Further, no one is going to buy new stock—which may be the next step to raise some of the gigantic total needed for expansion—unless the outlook for the industry matches, say, the chemical industry. The only way to increase earnings, cut costs and make a good showing is to replace old equipment and add new capacity.

All that takes money. Money comes from prices and borrowing. So—the outlook for answering some of the perplexing questions in steel involves prices and obtaining risk capital. Soon these essentials and practical considerations will override politics, timidity and customer fear.

CENSORSHIP: It Threatens Progress

Government controls over scientific developments hold back industrial progress . . . Duplication of new alloy research is one major example . . . Congress reviews policies—By N. R. Regeimbal.

 UNNECESSARY government censorship over scientific and technical developments may be hindering this country as it strives to maintain industrial superiority.

As a result, bigger and bigger industry research outlays are necessary, even though they often are spent only to duplicate an already developed discovery.

That's the charge top scientists and technicians are making. A major part of the duplicated reresearch, they say, is in the area of new alloys (many developed or tested by atomic energy means.)

Lose Valuable Time

If industry had reasonable access to the tremendous amounts of unnecessarily restricted technical data, and could have used it to speed up development, this country could have been several

years ahead in its technology.

Another result of secrecy is its effect on the research scientists and technicians—they're afraid to talk about a problem to other scientists who might have the answer, because of implied government restrictions. A research project may not be secret, its results may be.

Strict military secrets, most scientists and technicians agree, should be kept confidential. But developments with only minor military applications—most of which are known by a potential enemy anyway—should be made public as a "calculated risk."

Do We Gain?

One scientist even goes so far as to theorize that if this country had no secrecy at all, making all our developments public, what we lost by withholding would be made up for many times by speedier developments of newer scientific discoveries. As a result, he says, we would have been farther ahead than we now are.

A case in point, these scientists say, is the secrecy surrounding the controlled thermonuclear reaction for use in generating power and heat. The hydrogen bomb is uncontrolled thermonuclear power, and the problems of one, they say, are not the problems of the other.

Private firms spent about \$3.5 million and used about one-third of their scientists and engineers in research and development work in 1953—at the time the military was spending three times that much on research. But much of the money, energy, and especially time spent was lost in duplication, the scientists say.

Many times, important technological breakthroughs come not by the research scientist, but by an engineer working in a plant, a home inventor, or in some other almost accidental way. The research scientist should learn of these developments immediately, and the developer should know he has solved a problem.

Instead, such discoveries are very often bottled up in the Pentagon or the Atomic Energy Commission where further developments await a duplication.

A House Government Operations subcommittee, investigating the extent and results of existing government secrecy policies, is going to question government officials responsible for classifying scientific information, and may come up with an answer to the difficult problem of censorship versus research.

Pentagon Goes Out of Business (Private)

◆ THE PENTAGON proposes to withdraw from a sizeable list of commercial-type operations. Defense Secretary Wilson says private business can do the jobs better and cheaper.

The proposed shut-downs are being checked over by the Congress, which has the last word as to whether or not each closing will be permitted.

Latest list of service-operated shops and related enterprises the Pentagon would remove from competition with civilian business names 45 activities. The combined total of these operations now marked for discontinuance reaches 92, the Defense Dept. informs the House and Senate Appropriations Committees.

A section of the Defense Dept.

appropriation act for the current fiscal year requires that the committees be given a 90-day notice of planned closings. In some instances, congressmen from districts in which activities were to be halted have argued successfully.

Largest single heading in the new list offered by the Pentagon is that for automotive repair activities, containing 19 shops in the East, Midwest and South. Closing is proposed for all these and for six office equipment repair shops, five tree and garden nurseries, five bakeries, four cobbler shops, three blueprint paper sensitizing plants, and an orthopedic brace shop.

Scheduled for curtailment, rather than closing, are two watch, clock and jewelry repair shops at naval shipyards.

TOOLING PLATE: Don't Overlook Magnesium

It's new, introduced to industry in April 1954 . . . Sales in 1956 expected to top million lb . . . Appliance, aircraft, automotive current big markets for jigs, fixtures, patterns.—By F. J. Starin.

◆ MAGNESIUM has found a new market in the metalworking field. Starting from scratch in April, 1954, magnesium tooling plate is taking aim on a 1956 market which will probably demand well over a million lb.

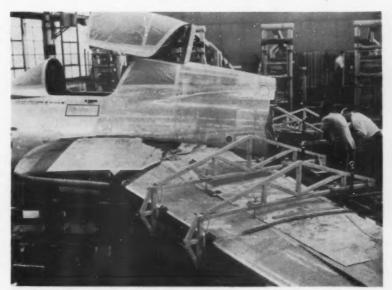
Appliance, aircraft, automotive, electronics and other industries have gone in for magnesium tooling plate in a big way, according to Dow Chemical Co., producer of magnesium mill products. Westinghouse Electric Corp. has converted nearly 50 pct of the checking fixtures and contour checking boards at its Columbus, O., appliance division to magnesium.

Sales last year were up substantially over 1954's total to about 250,000 lb. By 1960, according to Dow, sales are expected to be up 1300 pct over '55.

Principal uses for magnesium tooling plate are for constructing jigs and fixtures for positioning parts and components; and patterns for precision drilling, cutting and shaping. Tool and die shops are taking increasing tonnages for certain types of dies.

Market Success

Dow claims there are four basic reasons for the current success and bright outlook for magnesium tooling plate: (1) basic cost-according to a Dow study, a cubic inch of magnesium tooling plate costs four cents while an identical cube of cast aluminum tooling plate costs five to nine cents. Wrought aluminum price is about the same as magnesium, but Dow claims other advantages including: (2) better machinability and, if proper techniques are used, better weldability; (3) handling -lightweight, and (4) relatively minute expansion and contraction



MAGNESIUM tooling plate fixture positions new trailing edge on Republic Aviation's F84F. Weight is a factor since new control surfaces require similar alterations at many out-of-the-way U.S. Air Force bases.

of the plate under normal temperature change.

Republic Aviation Corp. uses a magnesium pattern to drill holes in a frame to attach doors. Air Force requirements insist on interchangeability. Only .001 in, tolerance is permitted.

Dow has appointed five distributors for its mill products, including tooling plate. The distributors are concentrating on selling tooling plate to smaller shops and businesses while Dow sales organization and technical group go after the bigger customers.

Thus far the most serious bone of contention has been the fear of some potential customers of the inflammability of magnesium dust and filings. Dow is attempting to solve this objection by producing close flat tolerances, mini-

mizing the need for grinding. Anneal flattening removes rolled-in stresses and reduces deviations to maximum of .005 in. in a foot of ¼ to 1 inch plate.

It's New

Because magnesium tooling plate is only in its industrial infancy, little is yet known about its service life. Oldest known pieces are in the Dow fabricating plant, Bay City, Mich. They were made near the end of World War II. Reports indicate that although the magnesium is tarnished, the pieces are still usable.

Newer applications which look like good bets for magnesium tooling plate include fixtures for plastic parts during vacuum aluminizing (excess aluminum can be stripped in a caustic solution which doesn't affect magnesium.)

BUSINESS: Expansive In '56

Capital spending will be up 22 pct over last year . . . Planned investment for durable goods total 7.7 billion dollars, up 41 pct . . . Railroads up 42 pct.

◆ DURABLE GOODS industries are going after new, broader markets this year, with planned plant investment scheduled at 41 pct over the 1955 level. Business generally is prepared to increase its plant and equipment spending 22 pct.

Capital expansion outlays by all types of businesses in 1956 are expected to total \$35 billion, compared with less than \$29 billion in 1955. Of the new investment, durable goods producers account for nearly \$7.7 billion. Nondurable goods firms account for \$7.3 billion, for a \$15 billion total.

New-record investment programs are projected by the automotive industry, with \$1.9 billion projects, and iron and steel producers, who intend to put \$1.3 billion on the line. Nonferrous metals and non-automotive transportation equipment firms will spend \$418 million and \$477 million respectively. Each of these four industries intend outlays 50 pct higher than in 1955.

Petroleum industry plant expenditures are to reach \$3.3 billion this year. Public utilities expect to invest nearly \$5 billion; mining, \$1.1 billion; nonrail transportation, \$1.7 billion; railroads, \$1.3 billion; and commercial and miscellaneous firms, \$10.6 billion.

Anticipated sales seen by manufacturers are 6 pct above those in 1955. Public utilities visualize a 9 pct sales climb, and trade firms figure the increase at 4 pct.

Production Pool

Twelve small firms in the Huntington, W. Va., area are forming a production pool to go after defense contracts they cannot handle individually. Small Business Administration is helping set up the arrangements and get contracts.

Pool puts the firms in line for contracts involving steel fabrication, sheet metal work, packaging, manufacture of optical equipment, electrical equipment and controls, heating and cooling equipment; machining; textile manufacturing, metal plating, and polishing and manufacturing of wire specialties.

Firms included in the pool employ 1,800 workers. Huntington is considered an area of high unemployment.

Companies in the pool include Armstrong Products Corp., C. W. Davis & Sons, Inc., Enterprise Wheel & Car Corp., Huntington Plating & Polishing Co., Le John Manufacturing Co., Fred McCorkle Machine Shop, Inc., Metal Craft, Inc., Peoples Co., Polan Industries, Inc., A. F. Thompson Manufacturing Co., C. I. Thornburg Co., Inc., and West Virginia Steel Manufacturing Co.

Credit:

"On-the-cuff" plans help industry buy equipment

Selling industry "on the cuff" is developing into a flourishing business.

Industrial financing organizations and machinery manufacturers are making it possible for many businesses to buy needed equipment and pay for it as it depreciates. In technical parlance, the repayment plan is patterned after the Government's "sum of the digits" method of capital equipment depreciation.

Wales - Strippit Corp., North Tonawanda, N. Y., manufacturer of hole-punching and notching equipment, calls its plan, "Pay-As-You-Produce." A 25 pct down payment is required; the remainder may be paid in a period ranging from three to 10 years. Interest is 4½ pct on the entire principal.

The C.I.T. Corp., an independent finance company, has adopted a plan identical to that of Wales-Strippit. C.I.T. says the idea was conceived immediately after adoption of the Internal Revenue Act of 1954 which permits equipment owners to depreciate faster.

C.I.T. also has arrangements with equipment companies whereby the company salesmen learn the details of "Pay-As-You-Depreciate" and are empowered to make all necessary arrangements with customers. C.I.T. then handles collections and accounting.

CAPITAL SPENDING PLANS Why '56 Will Exceed '55

	(millions)		
	1955	1956	Pct Increase
Manufacturing	\$11,439	\$15,036	31
Durable-goods industries	5,436	7,685	41
Nondurable-goods industries	6,003	7,351	22
Mining	957	1,141	19
Railroad	923	1,307	42
Transportation, other than rail	1,602	1,784	11
Public Utilities	4,309	4,989	16
Commercial and other	9,471	10,636	12
Total	28,701	34,893	22



• FORK LIFT truck, towing tractor, and mobile crane operators are finding they can cut fuel and maintenance costs by switching from gasoline fuel systems to liquefied petroleum gas.

Backstopping the significant number of field conversions to LP-Gas which have been made to date, is a noticeable swing in the past year to factory-designed units by big-name truck producers.

Among these, Yale & Towne, Clark, Buda, Towmotor, and Baker-Raulang are actively pushing sales of new, assembly-line LPG models.

Industrywise, output is expected to triple by 1960. A big midwest truck producer estimates that around 20 pct of his sales this year will be LP-Gas trucks, from almost nothing a year ago.

And, truck users who want to make their own conversions in the field to an LPG fuel system, now have a raft of parts kits to choose from, put out by over half a dozen reputable firms.

Consumption Gaining

A kit will usually include a fuel filter, a converter to evaporate fuel and reduce fuel pressure, a carburetor modifier, and the necessary lines and fittings. Changeover costs generally run anywhere from \$150 to \$300 per truck, depending on the type system installed.

In addition, a growing nationwide network of LP-Gas distributors is making it easier for truck users to set up conversion standardization, install proper fuel storage facilities.

Last year, approximately 670 million gallons of LPG were consumed as motor fuel. This year,

LPG: Savings For Truck Users

Liquefied petroleum gas is showing up well as a fuel for industrial trucks . . . Fork lift operators cite lower fuel costs, less downtime among plus factors—By D. G. Picinich.

distributors say the picture looks even brighter. A large New Jersey outfit which sold large amounts for motor fuel last year, expects to hit around 1 million gallons for lift truck use alone this year.

Consumer enthusiasm for LPG as an industrial truck fuel is mounting.

Lockheed Aircraft Corp., after spending about \$22,000 to convert over 100 fork trucks and towing tractors to LPG, estimates its operating costs have dropped around \$40,000 a year.

Fuel Cost Savings

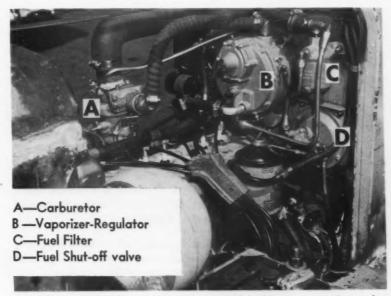
National Supply Co., a large machinery fabricator, is converting 25 gasoline jobs at its Torrance, Calif., plant. It figures operating costs will be sliced at least \$4,000 annually.

In the midwest, Ford Motor Co. plans to convert its industrial truck fleet to petroleum gas.

P. F. Walker of Bethlehem Steel cites some findings his firm has made after running extensive tests on 21 LP-Gas lift trucks and 8 highway units.

Careful investigation, he notes, shows fuel costs come to 4¢ to 5¢ less per gallon on the company's LPG-converted units. Based on Bethlehem's experience to date, additional savings are showing up in longer life for oil, oil filters, and spark plugs.

In several instances, fleet owners whose gasoline equipment normally idled much of the day, found spark plug fouling an increasing problem. Gradually switching over to LPG, they find this has almost disappeared.



CONVERSION to LPG can be readily accomplished by any one of a number of kits on the market. They include carburetor, converter to evaporate fuel to reduce pressure, fuel filter and lines and fittings. Cost, \$150 up.

TINPLATE: Big Red Sales Push

Russian bloc production way up . . . Restrictive domestic markets force major export campaign . . . Free world matching communist activity in world markets.

 RUSSIA and her satellites are hawking their tinplate wares louder than ever.

Russia consumes little tinplate and yet her output in 1955 amounted to nearly 600,000 tons as compared to only 300,000 tons in 1950. Communist-dominated countries are also turning out tinplate at a higher rate.

Czechoslovakia produced over 85,000 tons last year, up 25,000 tons over 1952. Polish capacity is currently around 55,000 tons. And East German output has been built up to about 35,000 tons.

Actually, Red tinplate production is not in the same league as total Free World. Non-communist countries turned out 6.7 million tons of tinplate in 1955 and are shooting for a 7-million-ton year in 1956.

Targets

Big advantage in favor of the Russians is that they can afford to set their price about 6 pct below U. S. and British quota-

Chief targets of the Reds "big sell" movement have been Austria, Switzerland, and Yugoslavia. All these countries have contracted for substantial tonnages. A trade deal with Yugoslavia calls for delivery of \$84 million worth of Russian tinplate in 1956. Shipments have also been stepped up to Communist China and the near and middle east countries. This vear the communist bloc will ship about 40,000 tons to India. And Burma will receive about 15,000 tons from the Soviet Steel and Coal Pool.

Free World Reaction

Meanwhile, British tinplate production has climbed to about 840,000 tons annually. She is the principal supplier to Thailand, Pakistan, Ceylon, Portugal, Sweden, and Denmark.

U. S. producers ship considerable tinplate to Turkey, Greece, Italy, and West Germany.

Dutch tinplate facilities at Ijmuiden have an annual capacity of about 48,000 tons, of which about 10,000 are exported, chiefly to Latin America and West Germany.

New plants opened by the Japanese will boost Island Empire exports to about 30,000 tons per year.

Despite the necessity for hard sell methods, the Russian bloc seems to have no intention of easing off. Even Red China is planning a new electrolytic tinplate facility near Hankow capable of turning out 40,000 tons annually. They already have a similar unit in operation near Anshan.

Overseas Briefs

Titanium price has been reduced to 21 shillings per lb by Imperial Chemical Industries, Ltd., England. This is less than \$3.00 per lb, compared to the U.S. low carbon price of \$3.45. Difference is claimed to be the use of the sodium refining process in place of the conventional Kroll process.

Motor Car industry in Great Britain is losing a large chunk of its European market to France and Italy because of lack of new ideas, high prices, long delivery dates and lack of service, according to a Reuters' report.

Egypt's first steel mill is scheduled to begin operations by the fall of 1957. Site is near Cairo. Initial output is expected to be about 245,000 net tons, about twothirds of Egypt's present needs.

Italian crude steel production depends on scrap for about 70 pct of its capacity. World average is about 30 pct, with U. S. companies averaging about 32 pct.

Everyone's In On The Act

The old saying, politics makes strange bedfellows, is particularly true in India today. The British will build a steel plant, the Russians will build a steel plant, and the West Germans will collaborate with the Russians in constructing two steel plants.

It looks like everyone is vying for Nehru's favor. And it also looks like a political stalemate, with the only one gaining being India. Each of the four plants will have a capacity of 1 million tons.

Russia—plant at Bhilai, in Madhya, Pradesh; 6 openhearths, 3 blast furnaces, blooming mill; cost \$230 million; soviet equipment \$115 million; full production expected December 1959.

British—plant at Durgapur, West Bengal; cost to India 52.5 million pounds, 15 million pounds to be borrowed from British government and 11.5 million pounds from syndicate of British banks.

West Germany, Russia—two plants; expected to start production in 1961; manufacture 720,000 tons of flat products, including heavy and light plate and strip.



NEW director of Electrical Equipment Div., BDSA, U.S. Dept. of Commerce, is Terry B. Martin of Square D Co.'s Industrial Controller Div. Mr. Martin will serve for 6 months.

Army Atom Training

First candidates for a two-year training course in operation of nuclear power plants for the Army will be 12 sergeants who will report to Fort Belvoir, Va., by April 23.

These men, not yet selected, are to be thoroughly trained to supervise crews in the running of atomic reactors. They will be chosen from among career soldiers with superior technical aptitude, and five months of basic technological courses at an accredited college.

Afterward, they will be given a month of practical training as apprentice operators of a reactor. Those picked for further instruction will be assigned to the Army package power reactor project at Fort Belvoir, or to the crew of the Borax, Ill. experimental power plant.

Army Civilian Program

New professional improvement program, for civilian employees of the Army, is concentrating on creating more favorable opportunities for advancement in supply and related logistics jobs, through a career management system.

Persons affected are those who

work for the Chemical, Signal, Ordnance, Quartermaster, and Transportation Corps; Army Medical Service; and Corps of Engineers.

A principal part of the new program, planned by the Deputy Chief of Staff for logistics, is to be the charting of career fields within occupational areas. Each employee's skills will be measured against requirements of his job, and training plans are to be offered to develop his ability to handle work at a higher job level.

Ore Carriers:

Government seeks to encourage construction.

Here's what government officials are considering as possible solution to the shortage of modern ore ships registered under the U. S. flag.

A Senate Commerce subcommittee is considering directing the U. S. Maritime Administration to pay operating subsidies to American ships carrying bulk cargoes in foreign and intercoastal trade. It is also considering amending laws to permit such subsidies to go to ships operating on the Great Lakes and inland waterways.

Office of Defense Mobilization is restudying expansion goals for oceangoing and Great Lakes ore ships to permit fast tax amortiza-

DEFENSE

tion to be granted for their construction. Problem the government has to lick to expand this country's ore fleet is twofold: Construction costs are about 40 pct higher than overseas. Even with subsidies, they tend to run higher.

Costs Prohibitive

Operational costs of a ship registered under the U. S. flag are so high that in most cases the operator can't compete with foreign-registered ships unless he gets hefty operating subsidies.

Another problem is that the Maritime Administration isn't sure it can grant operating subsidies to ships other than common carriers on regular trade routes. Sen. Magnuson's subcommittee indicates it will direct the administration to offer the subsidies anyway, and thus shoulder the responsibility if it turns out to be illegal. Great Lakes and other ore ships are eligible under the "trade-in-and-build" program to sell ships 12 years old or older to the government and use the funds as a down payment for a new ship. Operating subsidy problem has to be licked before the construction problem becomes too important.

Rails to Carry Rockets

• RAILS supplied by the Colorado Fuel and Iron Corp. for an experimental railroad in the southwest desert carry the fastest landborne vehicles in the world. They are rocket propelled sleds used by the Air Force to study hazards faced by a pilot bailing out of a fast moving jet plane. Top speed of these units is about 750 mph. The sleds are mounted on sliding runners which grip the rail heads. The 3500 ft run consists of a series of 39 ft rails anchored by concrete ties with water trough for braking in center.



EXPANSION IN INDUSTRY

Water Project

Granite City Steel plans to build a pumping station on the Chain of Rocks Canal of the Missisippi River, a concrete reservoir at its plant, and more than four miles of underground pipeline, in order to satisfy increased demand from growth of steelmaking capacity. At present the company obtains almost all of its industrial water from the ground water supply via its own Ranney wells.

Granite City Steel consumes 5000 to 6000 gallons for every ton of steel it produces and finishes. The water is used to cool blast furnaces, openhearth furnaces and heavy mill equipment, and to quench hot steel.

Before this project can be started, Granite City Steel must obtain easements from the various parties concerned along the pipeline route. A 54 - inch - diameter pipeline would start at the pumping station just north of the locks at the south end of the canal. From there, it would run northeast and east for three miles, connecting with the concrete reservoir. Booster pumps at the reservoir would send the water through smaller pipelines to the company's Steelworks and to its Blast Furnace Department.

Buffalo Brass

Buffalo Div., American Brass Co., will invest over \$1.5 million in 1956 to expand its operations.

Clearing of the site and relocation of the machine shop will cost \$118,000. The new tube manufacturing facility will require \$560,-000, plus \$859,000 for new machinery and additional equipment.

Work will commence at once, and is expected to be completed in early 1957.

PRODUCTION has been started on Jones & Laughlin's new \$6,250,000 continuous hot-dip galvanizing line at J & L's Pittsburgh works. The line has a rated capacity of 7000 to 8000 tons of galvanized sheets a month.

Chemicals:

Pennsalt to spend \$55 million in 5 years.

Pennsylvania Salt Mfg. Co., Philadelphia, major chemical company, will spend \$55 million during the next five years in a three pronged expansion project, largest in the organization's history.

The initial phase will account for most of the expenditure. It will be aimed at developing products and processes new to the company.

Second category will be production of present products for which an increase in demand is expected. Third part will be emphasis on cost reduction.

Already under construction as part of the program is a multi-million dollar plant at Calvert City, Ky., for production of aerosol propellants and refrigerants; facilities for the production of calcium hypochlorite at Wyandotte, Mich.; and additional chlorine facilities at the Tacoma, Wash., works. A new anhydrous a m m o n i a plant is planned at Portland, Ore.

To strengthen raw material supply Penn Salt will begin new operations for mining and milling of fluorspar in western Kentucky.

Funds set aside for research will be increased 40 pct in 1956 over the previous year.

Expansion Briefs

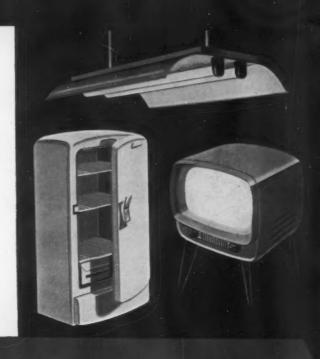
Westinghouse Electric Corp., Elmira, N. Y.; new electronic tube warehouse.

E. J. Lavino and Co., Philadelphia; double facilities at Lynchburg, Va., for producing standard high carbon ferromanganese, total capacity up 50,000 tons; cost about \$4 million.

Marquardt Aircraft Co., Van Nuys, Calif.; modernize and expand research and development facilities; cost about \$6 million. if your product is
PAINTED
ENAMELED

LACQUERED LITHOGRAPHED





here's how

WEIRZIN

electrolytic zinc-coated steel

seals it against rust and corrosion

Decorative color finishes adhere to Weirzin Electrolytic Zinc Coated Steel as though they were part of it.

The secret is in Weirzin's ductile zinc coating, which is bonded to the steel so tightly that it remains intact even under the most severe conditions such as high heat or humidity, deep drawing, stamping or forming. Result: no underfilm rust or corrosion.

Thus paint, enamel, lacquer or ink surfaces cannot be attacked from underneath; hence they cannot crack, chip or flake. No wonder Weirzin products look better, last longer, sell faster!

Weirzin is available with or without chemical treatment in coils or cut lengths, in all regular widths and gauges. If you would like specific information on the many ways in which Weirzin may benefit your product, please fill in and mail coupon (right) today.



WEIRTON STEEL COMPANY

WEIRTON, WEST VIRGINIA





WEIRTON STEEL CO., Weirton, West Virginia

I would like to know more about Weirzin.

My product is

NAME

POSITION

COMPANY.

ADDRESS

CITY_

ZONE___STATE_



of steel plate quality?

The quality of any product is hard to gauge exactly. Two of the most accurate gauges of steel plate quality are, first, the degree of control exercised over its production—during every step from iron ore to finished plate—and, second, its acceptance by fabricators and users.

When you order Claymont Carbon and Alloy Steel Plates—including Abrasion-Resistant and Low Alloy High Strength Steel Plates—you are assured of top quality... because each step is conducted in CF&I's own blast furnaces, open hearths and rolling mills, following the most rigid control and testing standards. Throughout the operation, the steel is constantly tested by our metallurgists to assure proper physical and chemical properties, to meet the exact requirements of *your* job.

But in the final analysis, the proof of product quality is always in its use. Claymont plates are being ordered by fabricators everywhere for a wide variety of uses, because they have proved their high quality time after time. You can order them in standard ASTM and AISI specifications, as well as special plates for special applications. To get full details, contact our nearest sales office or write to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Del.



Claymont Steel Products

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

3538

Ablene - Albuquerque - Amerillo - Atlanta - Billings - Boise - Boston - Bullislo - Butte - Caspor - Chicago - Denver - Detroit - El Paso - Ft. Werth - Houston - Lincoln (Reb.) - Los Angeles
New Orleans - New York - Oakland - Odessa - Okiehema City - Philadelphia - Pheerix - Portland - Pueblo - Salt Lake City - San Francisco - Seuttle - Spekane - Tulsa - Wichita
CAHADIAN REPRESENTATIVES AT: Edmanton - Taronto - Vancouver - Winnipeg

OTHER CLAYMONT PRODUCTS

Steinlass-Clad Plates - Flanged and Dished Hoods - Manhole Fittings and Covers - Large Diameter Welded Steel Pipe - Flame Cut Steel Plate Shopes - Lottre-Clad Hickel Plated Steel



YES . . . even your automobile wheels are assembled with Sciaky Resistance Welding

Every weekend millions of families just like yours take their Sunday drive in automobiles with spot welded wheels!

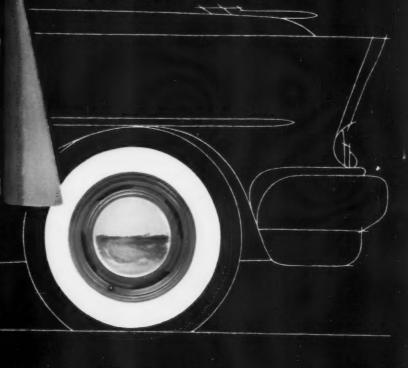
Every day of the week outstanding manufacturers like Motor Wheel are turning out thousands and thousands of those wheels with Sciaky patented Three-Phase resistance welding . . . faster and at lower cost than ever before!

And as for quality — years of exhaustive testing proved eight Sciaky spot welds better than the previous twelve precision rivets.

Whether you make automobile wheels or not, if you do join metals in production — if you want it faster and better and at lower cost — see about Sciaky resistance welding — just like the wheel people did!

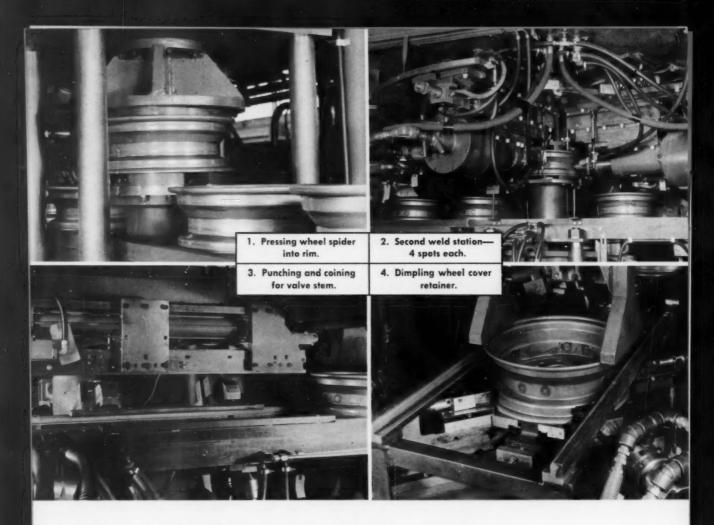
SEIAKY

Largest Manufacturers of Resistance Welding Machines in the World



Dick Carlston

Turn the page for the impressive details of this tremendous improvement in wheel fabrication

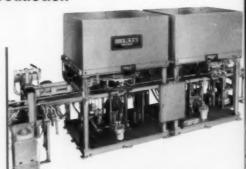


Sciaky Resistance Welding Techniques readily satisfy critical primary structures with weld integrity and consistency in high production

Today Motor Wheel and other leading manufacturers are fabricating critically stressed automobile wheels with eight Sciaky Three-Phase spot welds instead of the previous twelve precision rivets. The elimination of the holes for rivets or other mechanical fastenings satisfies the air-tight requirements for tubeless tires as well.

A true example of automation, fully automatic Sciaky equipment includes press assembly of parts, piercing and coining of valve hole, and dimpling wheel trim retainers. Skilled labor no longer needed is made available for other important operations.

This tremendous advance in design concept and production methods is the result of years of exhaustive testing and development. Only Sciaky patented Three-Phase balanced load welding with 85% power factor (compared to 30% for conventional unbalanced load single phase) provides the integrity and consistency necessary to critical wheel assembly.



Write today for "Resistance Welding At Work," Vol. 4—#9, completely describing this outstanding application—yet another fine example of Sciaky basic thinking . . . resistance welding techniques to do more useful work at lowest operating cost with maximum reliability.

Largest Manufacturers of Resistance Welding Machines in the World



REPORT TO MANAGEMENT

How Serious Is the Price Squeeze?

You don't have to be told that price and cost pressures are mounting in all directions. It may be that you'd rather not be reminded. But the unpleasant fact is that the price front probably will have to yield from the amazingly stable line it has held for several years.

Competition and productive

capacity have been the main factors in keeping the consumer from feeling the full effects of increasing costs that have been absorbed by manufacturer and (in some cases) retailer.

Autos and appliances are

best examples of how consumers have benefited by sales competition. Prices of semi-finished goods and materials have climbed, but prices to the consumer have remained level. In many cases it has been at the expense of discounts or small unit profit by the dealer.

Productive capacity has been

responsible for this. Only the ability of industry to maintain a major defense program, fill our world market commitments, and still saturate the consumer demand has made that possible.

Why It's Different Now

But this year, the price squeeze and competition for materials is too tough to resist entirely. There isn't any indication of a price runaway, but the line will have to give way. Here's why:

There will be stiff demands

from labor and the result will be more pay raises and costs of added benefits. In the auto industry, a 6¢ per hour raise is automatic, plus any cost-of-living increments that might occur. Others face similar obligations.

And basic materials are climbing

substantially. Steel has already gone up almost \$2 a ton since last July, principally through the addition of "extras." After this year's

labor negotiations, steel is going up a conservative \$8 to \$9 per ton.

Copper and aluminum will also

climb. Copper has jumped 3ϕ per lb this year and another 2ϕ is likely. Producers don't want to raise prices, but may have to in the face of world demand and pressure from the Chilean government.

What It Means to Consumers

The auto industry is a good example to use for price evaluation. Prices of 1956 cars were up a little. Although discounts are prevalent, letting up on dealer pressure has stiffened the salesmen's backs somewhat despite a slower market.

The steel price increase will

come at the end of the model year. Look for significant auto price boosts when the 1957 models hit the showrooms. Major changes in most models will make it easier for producers to pass on some of the increased costs. One theory is that price increases will be substantial, but that the blow will be "softened" by making former optional equipment standard.

Consumers Are Still Eager

A survey of consumers by the Federal Reserve Board shows no letup in buying plans. Just as many or more families plan to buy a new car, home, furniture or appliance this year as did last year.

Here's how it looks:

About 8 pct of all consumers plan to buy new cars this year, another 7 pct used cars. Some 9.6 pct expect to buy a house this year, slightly more than last year. Purchases of furniture or major household appliances are planned by 28 pct of all families.

They have the money

too. About 35 pct of those polled report incomes of more than \$5,000, compared with only 32 pct last year and 31 pct in 1954.

INDUSTRIAL BRIEFS

On My Honor . . . A group of engineers headed by Roy E. Marquardt, president of Marquardt Aircraft Co., has inaugurated an experimental unit of "Science Scouts" which aims eventually at becoming an official part of the Boy Scouts of America. Longrange value of the movement is viewed as favorable in terms of maintaining the supply of engineers and scientists necessary for continued technological progress and national defense.

Dead Reckoning... Servo Corp. of America, New Hyde Park, N. Y., has been awarded a Navy contract totaling over \$1 million for its Dead Reckoning Tracer navigation systems. DRT is now standard equipment in the Navy's WV-2 Lockheed Super-Constellation-type aircraft to facilitate high-altitude direction of fighter planes and missiles.

Striking Move . . . Impax, Inc., has been established by Universal Match Corp., St. Louis, Mo., to produce precision aluminum impact extrusions. Universal has previously turned out aluminum impact extrusions in its armament divisions.

Western Welding . . . K S M Products, Inc., Stud Welding Div., Merchantville, N. J., has opened a new district office in San Francisco, Calif.

Salesman's Salesman . . . Aaron Rupp, Michigan representative, Eutectic Welding Alloys Corp., N. Y., is the first representative of a welding manufacturer to receive the Distinguished Salesman's Award of the National Sales Executives Club. Presentation of the trophy was made by James A. Farley, chairman of the board, Coca-Cola Export Corp.

Move that Ore . . . In anticipation of an increase in imports of foreign ore, the Canton Co., Baltimore, has awarded Heyl & Patterson, Inc., Pittsburgh, a contract to erect a high-speed ore boat unloader on the Canton Railroad ore pier. It will be operated by the Cottman Co., an operating subsidiary.

Best Dressed Men... Duquesne Works of U. S. Steel Corp. utilizes distinctive markings on wearing apparel as a safety feature. White helmets are required wearing for all new employees during their first 30 days on the job so that an untrained man can be protected by old timers from commonly recognized hazards.

Light Stamp . . . Hungary is celebrating the 20th anniversary of the establishment of its aluminum industry by issuing the world's first postage stamp of aluminum. The stamp will be printed on foil with a paper backing. Printing will be limited.



"Personnel is sending us a young math major who knows nothing about systems and—get this—has no opinions about them."

Venture . . . R. W. Broderick, formerly with Reynolds Metals Co. and Modern Engraving & Machine Co., is forming the Alclyde Engraving Co. in Chatham, N. J., to manufacture precision application cylinders, printing rolls, embossing rolls and embossing machines and equipment.

Two-to-one . . . Commercial Filters Corp., Melrose, Mass., has purchased Houdaille - Hershey of Indiana, Inc., makers of Honan-Crane filters, and the filter division of Michiana Products Corp. and merged the two into a new subsidiary called Indiana Commercial Filters Corp.

Lathes Rep... McBeth Machinery Co., Pittsburgh, has been appointed to handle sales and distribution of automatic tracer lathes manufactured by Hydra-Feed Machine Tool Corp., Ferndale, Mich.

22 for 61st... American Can Co. has taken an option on about 22 acres of land north of Cincinnati for a new can making plant. Construction will begin as soon as possible. It will be Canco's 61st container installation.

Share Wealth . . . Clifford F. Hood, president of U. S. Steel Corp., indicated that the corporation is considering a change in the non-contributory part of its pension plan which would permit participating employees to designate a co-pensioner.

Diversification . . . Crane Co., Chicago, and Vitro Corp. of America, New York, will each have equal ownership of Heavy Minerals Co., and its mining subsidiary, Marine Minerals, Inc., producing thorium, rare earths and heavy minerals from manazite, as well as rutile, ilmenite, zircon and kyanite.



TIPS FROM A ROLL MAKER'S NOTEBOOK

MACKINTOSH-HEMPHILL DIVISION, E. W. BLISS COMPANY, Pittsburgh 3, Pennsylvania

Cast mill rolls . Johnston cinder pots . rotary tube straighteners . end-thrust bearings . heavy-duty lathes . steel and special alloy castings

Choosing rolls for slabbing and blooming mills

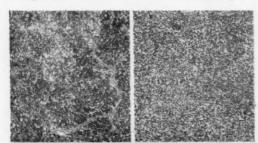
Cast steel rolls for blooming and slabbing mills must combine good resistance to fire cracking with the strength necessary to stand the severe stresses developed by these mills.

Other considerations that affect the choice of rolls include severity of the service and the method of roll cooling. Variations like these can mean good service from inexpensive rolls in one mill while in another the only practical solution lies in costlier, higher alloy rolls.

Two heat treatments – Heat treatment is used primarily to improve roll strength. However, heat treatment also affects resistance to fire cracking – metallurgists believe that there is a relationship between fire cracking and the elimination of the carbide network from the crystalline structure of cast steel.

Mack-Hemp has developed two heat treatments for blooming and slabbing rolls. The first is an air quench and draw, and develops maximum strength. It produces rolls with excellent resistance to the very severe localized concentration of stress that occurs each time the steel goes through a pass.

The second heat treatment, a double anneal, produces a spheroidized carbide structure with good strength and excellent resistance to fire cracking.



Carbide network (left) stands out clearly in specimen of roll with ordinary treament. Picral etch, 500 magnifications. Network in Midland Superalloy (right) has been almost completely destroyed by special Mack-Hemp heat treatment. Picral etch, 500 magnifications.





Severe fire cracking ended the service life of the slabbing roll whose surface is shown at the left. Surface of Midland Superalloy roll at right shows excellent fire cracking pattern (roll had reached worn-out diameter after more than 600,000 tons).

Three types of rolls—Both of these heat treatments are modifications of older practices, designed to decrease the amount of grain boundary carbide in the finished roll, thus improving fire cracking resistance. Either treatment can be supplied in the three grades of Mack-Hemp cast steel rolls recommended for slabbing and blooming mills:

Midland Superalloy, a nickel-chrome-moly roll especially developed for applications where fire cracking is a severe problem. There are cases on record where sets of Midland Superalloy rolls have rolled 700,000 tons and more before reaching worn-out diameters.

Technalloy, a chrome-moly roll that has thoroughly proved itself under standard operating conditions.

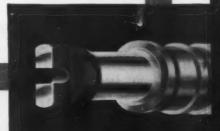
Technisteel, a carbon steel roll which gives good service at low initial cost under mild-to-average operating conditions.

Squeezing maximum tonnages from your mills... at minimum roll cost...is far easier when you enlist Mack-Hemp's aid. For help with your particular rolling problem, write us today.

MACKINTOSH-HEMPHILL

You get more tonnage from the rolls with the Striped Red Wabblers

Division of E. W. BLISS COMPANY PRESSES, ROLLING MILLS, SPECIAL MACHINERY





Shell Molding Takes Over at Pontiac

All Pontiac crankshafts now are shell molded . . . Process may some day replace forging throughout industry . . . Cuts cost, saves weight, and extends tooling life . . . Pontiac first in GM—By T. L. Carry.

♦ INDICATIONS are that forging of all crankshafts for automobile engines may some day be replaced by the shell molding process. The Central Foundry Div. of General Motors Corp. is presently using the method and is producing all the crankshafts that will be used in the 1956 Pontiac.

Pontiac, after extensive testing of the units, has just announced that it is switching entirely because of economic factors.

It is reported that the cast cranks are just as good as the forged units and the savings per crank are considerable.

Thoroughly Tested . . . Pontiac first became interested in the

castings in 1954 after the Central Foundry Div. began to consider their mass production seriously. At first, the crankshafts were ordered in a limited number for testing purposes.

Results were so successful that Pontiac is now using the units exclusively.

Pontiac points out that use of the new crankshaft has increased tool life considerably. In this respect, high speed tools in some instances quadrupled their life and the life of carbide tools was extended 10 times.

Big Savings . . . The savings in weight and material costs were another factor in the switchover.

For example, the regular forged crankshaft which the division formerly used had a rough weight of 76 lb and weighed 58 lb after machining. In contrast, the cast crank has a rough weight of 64 lb and weighs 54 lb after it is machined. This difference represents a big saving for the division.

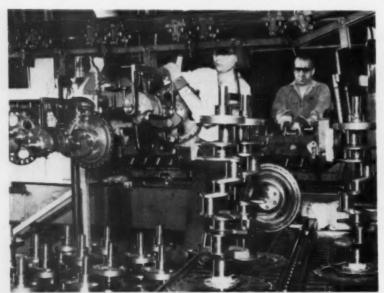
The Central Foundry Div. took a serious look at mass production of crankshafts in 1954. The advent of shell molding and the development at the GM Technical Center of a new type of Arma-Steel were the two main factors which influenced the decision.

The addition of bismuth and boron to regular pearlitic malleable iron gave Central Foundry the type of metal which was needed for regular production. Pontiac, after seeing the savings that were possible, was sold on the idea.

Central Foundry foresees a great future for cast crankshafts. James H. Smith, general manager of the division, says that their use is going to increase as the automobile industry progresses.

Solves Problems . . . Mr. Smith foresees the time when the regular automobile engine will be so complex and the designs so intricate that shell molding will be the only answer to the problems that arise.

The division manager is quick to point out that another advantage to shell molding is that the material used is not in critical supply. In addition, castings leave less stock to be removed by machining and even eliminate some



BIG reason Pontiac Motor Div. of General Motors is switching to shell molded cast crankshafts is cheaper material cost and extended tool life. Pontiac reports that as of March I all its crankshafts are shell molded.

... the

BULLARD

pendant control . . .

is handy
sure handy
for the tor"

Says boring mill operator at Fuller Company, Manheim, Pennsylvania, manufacturers of conveying equipment, coolers, compressors and vacuum pumps. Also, he says, "there are no levers to mess around with. On the Bullard H.B.M., Model 75, I can mill on a 45° angle in any quadrant instead of having to jockey in one direction, then in the other—We I had to do on the old machine."

is outstanding
for ease of
operation

For full information on all the cost saving advantages offered by the Bullard Horizontal Boring, Milling and Drilling Machine, Model 75, including screw and rack feed, wide speed ranges, extra rigidity in Bed, Head, Head Post and Rear Post, optical measuring equipment (optional) and Automatic Positioning for head and table (optional).

CALL YOUR NEAREST
BULLARD SALES OFFICE
OR DISTRIBUTOR
OR MAIL COUPON TO

THE BULLARD COMPANY
286 CANFIELD AVENUE—BRIDGEPORT 2, CONNECTICUT
Please send me a copy of the
NEW H.B.M., MODEL 75 CATALOG...

NAME____

COMPANY_____POSITION___

CITY_____ZONE___STATE____



work, Patapsco tunnel, contract TT-103. Baltimore, through Buckley Inc., Philadelphia, to Harris Structural Steel Co., New York.

2000 tons, south wing, Riverside church, Riverside drive and 119th street, New York, to Harris Structural Steel Co., New York.

715 tons, four beam bridges, Spaulding turn-pike, Dover, N. H., to American Bridge Division, U. S. Steel Corp., Pittsburgh, through W. H. Hinman, Westbrook, Me.

2000 tons, municipal high school for the printing trade, Manhattan, New York, to Lehigh Structural Steel Co. Allentown, Pa.

1440 tons, five nose wing hangars, Elmendorf Air Base. Alaska, to Bethlehem Pacific Coast Steel Corp., Seattle; Baker-Ford Co., Bellingham, Wash., general contractor at \$5,418,110

1050 tons. plant addition. West Virginia Puip & Paper Co., Charleston. S. C., to Bristo Steel & Iron Works Inc., Bristol, Va.

The trend is to THOMAS 300 tons, addition to pumping facilities ford Works, to Isaacson Iron W Morrison-Knudsen Co general contractor.

300 tons, manufacturing house, R. T. French to Easton Steel Str A. B. Roth & Co tor steel fabricating machinery

four Manchester. Rolling through 280 tons.

Co., Ca Corp., Buildin

bridge.

200 ton Isancs 190 tons

Wilson 175 tons Cambrie Provide

150 tons. Wash. Co., to Jo 145 tons, garag

Cambridge. tural Co. 3500 tons, 49 into ower plant. St Manning, Maxwell Heights, Mich., sc Heights.

Inc., New York, eight gates for Massena also schedule 3 coveri and delivery of equipment; the New York State Power

180 tons, students union building, of New Hampshire, Durham, Groisser & Shiagor Iron Works, Somerville Mass.; J. A. Volpe Construction Co., Malden, Mass., general contractor

100 tons, state school, Portland, Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Consolidated Constructions Inc., Portland, Me., general contractor.

2100 tons, superstructure, St. Lucie canal, Florida state turnpike, to Mount Vernon Florida state turnpike, to Bridge Co., Mt. Vernon, O.

1890 tons, four buildings, International Business Machines Corp., Owego, N. Y., to Har-

ris Structural Steel Co., New York. \$19 tons, state highway bridges, Southeast expressway, Boston-Milton, Mass., to American Bridge Division, U. S. Steel Corp., Pittsburgh; Savin Construction Co., East Hartford, Conn., general contractor (reported in Street, Nov. 21, as involving 1350 tons).

14-story apartment, 136 E. 55th w York, through Emery Roth & Sons, to Harris Structural Steel Co., that city.

1300 tons, office building, Connecticut Mu-tual Life Co., Hartford, Conn., to Harris

3000 tons, office, 123 William St., New York placed by Diesel Construction Co., with the Harris Structural Steel Co., New York. 250 tons, 82 transmission towers, Public Service Electric & Gas Co., Bayway, N. J.,

to Bethlehem Steel Co., Bethlehem, Pa. 534 tons. 4-story branch. First National Bank. Portland. Oreg., to Bethlehem Pacific Coast

Steel Corp., Seattle. 275 tons, warehouse, Rexall Drug Co., Boston. to Groisser & Shlager Iron Works, Somerville. Mass

ville, Mass.
220 tons. state bridge, Union county, Pa., to
Bethlehem Steel Co., Bethlehem, Pa.
150 tons. Franklin National Bank building.
Rockville Center, N. Y., through Niel Nielsen, general contractor, to Kurtz Iron Works. Long Island, N. Y., fabricator.

150 tons, state bridge, Ulster county, N. Y. through the Pine Brook Construction Co. the Klevin Engineering Co. New York 375 tons, bleach plant "

that cuts costs in

a competitive market*

800 tons, municipal power plant, 74th fit., New York, to Lehigh Structural Steel Co., Allentown, Pa.

450 tons. Boehm Junior High School, Township, Pa., to American Bridge Division, U. S. Steel Corp., Pittsburgh. 425 tons. school, Mackworth Island, Falmouth,

Me., to Bancroft & Martin Rolling Mills Co., South Portland, Me.; Consolidated Constructors Inc., Portland, Me., general contractor; 36 tons, reinforcing bars, to same shop.

5070 tons, office building, Union Dime Savings Bank, 6th Ave. and 40th St., New York. through George A. Fuller Co. to the Harris Structural Steel Co., New York.

4550 tons. reconstruction, DeKalb avenue sub-way station, sections 1 and 2. Brooklyn, N. Y., through Polrier & McLane Corp., general contractor, to Harris Structural to Harris Structural Steel Co., New York.

1335 tons, seven grade crossings and Mill river Connecticut turnpike. Fairfield. Project 309-01, to Bethlehem Pa.: Poirier & McLane

dge, Berks county. Pa., . C. Wagman. ontractor, to Lehigh Pa. No. 204. Queens.

I Steel Co., Al-Brooklyn.

> eel Co., Allen-Brooklyn. Co., Allen-

> > Hartford. Machester. rcing to

Excilities. Bethiehem

including nino Coneral con

w Eng-6 Betnadirect. Steel Co..

Structural

D. V. F general ci and 865 to

140 tons. Inc., Bristol. 137 tons, Idah

bridge, to Corp., Seattle. 9000 tons, power Edison Co., ican Bridge

Pittsburgh; al 9000 tons, per Co., Staten Is Bridge Divisi burgh; also 20

mile elevated

303-01 and

MACHINE MANUFACTURING Co.

*The majority of these

successful bidders have

Thomas-equipped shops

PITTSBURGH 23, PA.

Punches • Shears • Presses • Benders • Spacing Tables • Special Machinery

Automotive Production

(U. S. and Canada Combined)

WEEK	ENI	DING	CARS	TRUCKS
MAR.	17,	1956	142,240	26,700
MAR.	10,	1956	138,870	26,434
MAR.	19,	1955	186,066	26,710
MAR.	12,	1955	181,053	23,232

*Estimated. Source: Ward's Reports

machining operations which are necessary on forged units. The deciding factor, according to Mr. Smith, is going to be the lower overall cost to the ultimate consumer.

At the same time it must be remembered that Pontiac is the only division in General Motors which is currently using the cast crankshafts exclusively.

Other companies also have their own forging facilities. Although cast cranks may have more to offer in the way of economy, it is unlikely that companies that have their own forge shops are going to dump them over night in favor of castings. Cost would be prohibitive.

On the other hand, Ford is casting crankshafts, but is using nodular iron. This operation is still very much under wraps, however, because, among other reasons, of litigation with the International Nickel Co. over the type of iron.

Balancing:

New gadget works on transmission parts.

A new automatic balancing machine, developed by General Motors Research Div., is currently being used to balance Hydra-Matic transmission parts to an extremely fine tolerance.

The machine uses electronic computers to rule out the possibility of human error. It automatically determines the amount and location of unbalance in the two torus units of the transmission.

The torus units are each shaped like half a grapefruit. One half is attached to the engine crankshaft and the other to the transmission. When filled with fluid, the units act as a fluid coupling in the transmission. To function properly, each unit must be balanced as perfectly as possible.

Done Automatically

The new machine achieves this balance by spinning each unit at 600 rpm. If out of balance, the units wobble slightly. The computer on the machine determines the location of the wobble and the information is automatically passed on to a welding station.

At this point, a metal slug is measured, cut to size and welded to the critical spot inside the torus. All of these operations are automatic. In addition, after the balancing job is done, the torus moves to a recheck station. Here, the unit is spun once again and, if the balance is still not up to standard, it is automatically rejected from the conveyor.

Quiet, Please

Solving the noise problem in automobiles is a lot more difficult than it appears to be on the surface. The greatest unmeasurable factor in the problem is the human element.

AUTOMOTIVE NEWS

People hear the same noises differently, in various degrees of intensity, and react to it in a number of different ways. A noise created by an automobile can be impartially recorded, but it must be interpreted as to cause and intensity by people whose reactions will not be the same.

Filters and noise meters are helpful in determining the amount and source of a noise, but a driver's attitude is the most important thing to consider and is also the most variable.

A motorist, for example, could be annoyed more or less by a noise depending on a number of things—the attitude of his wife, how much sleep he has had, etc.

There is no single instrument that can be used to evaluate the human factor. Engineers have tried to develop an annoyance meter to measure degrees of displeasure but it is doubtful that such a machine could ever actually be built.

THE BULL OF THE WOODS

By J. R. Williams



They're making a BIG HIT

in production shops.

POWERMAT

The new Powermatics are medium-size production type millers with a powerful spindle drive . . . actually 200% more power than the previous design. 71/2 hp cuts are just routine performance. And because of the many setup conveniences, you can get going fast! Change-over time from one job to the next is comparable to many knee-type millers. Just consider the cost-reducing possibilities of these Powermatic features:

Automatic two-way table cycles; reversible through a selector knob

Cycle selectors control the automatic

functions; can be interchanged in a minute or two

Single lever table control; for starting automatic cycles . . . for manual control when setting up the job

Automatic backlash eliminator; adds down-milling and reciprocal milling to Powermatic versatility

Automatic spindle stop; at any point during the cycle, controlled by cycle selector

Three styles: Plain, Duplex, Plain Rise and Fall

Of course, there are many additional ways in which the new CINCINNATI Powermatics can help you produce more at a lower cost. You can't afford to overlook these fine new CINCINNATIS. Ask for catalog No. M-1913.

THE CINCINNATI MILLING MACHINE CO. CINCINNATI 9, OHIO





BRIEF SPECS.

table working surface.... 11" x 55 %" to 11" x 126 % range: table travel 24" to 96 spindle carrier.... 8" quill (cross)..... 3"

table rapid traverse..... 300" per min. 1/2" to 20" per min. 16 table feeds: std..... high series A..... 1" to 40" per min. 2" to 80" per min. high series B....

30-1200 rpm 16 spindle speeds..... 50-2000 rpm (std.) 75-3000 rpm



MILLING MACHINES - CUTTER SHARPENING MACHINES - BROACHING MACHINES - BROACHING MACHINES - FLAME HARDENING MACHINES OPTICAL PROJECTION PROFILE GRINDERS - CUTTING FLUID

OPTICAL PROJECTION PROFILE GRINDERS . CUTTING FLUID



News Blackout Can Hide Inefficiency

Press and others concerned over censorship in Washington . . . Only favorable news gets out . . . Bureaucrats avoid criticism by censorship and withholding information . . . Scientific progress hit—By G. H. Baker.

♦ AN OMINOUS TREND toward secret government is under way in Washington. There's a growing tendency among federal officials to widen the current limited areas of censorship so as to take in all types of government information.

Many bureaucrats are learning that one way to avoid criticism from the Congress and from the public is to keep the Congress and news correspondents from finding out what they're doing—what they are not doing.

Few persons question the government's right to prevent disclosures that could endanger national security. But many qualified engineers, editors, and educators are now grimly aware that Washington's bureaucrats are trying to convince each other that they have an inherent "right" to decide what the public shall know.

Extend Curtain . . . They are now extending this "right" to take in nonmilitary information as well as military facts.

Congress is beginning to realize how far the Executive Branch of the government has gone in assuming censorship "rights." House members were frankly shocked recently to hear the chairman of the U. S. Civil Service Commission tell them of his "right" to decide what the public shall know—and what it cannot know—about government.

More and more, federal officials are coming around to the notion that "freedom of the press" is not the right to publish what is true, but is rather the right to publish only that information which the government thinks is "suitable for publication."

Little Interest . . . This flagrant abuse of power shows how far the camel has moved into the tent. Power "grabs," successful bids for more authority, have gone unchallenged by the Congress, by the House, and by the public. Nobody seems to care. As a result, the bureaucrats can truthfully say they've been withholding facts for 20 years without hearing protests.

A congressional subcommittee headed by Rep. John E. Moss, D., Calif., is looking into the problem. To Mr. Moss' credit, it must be said that he has confined his inquiry to the constitutional question involved (freedom of the press) and has avoided the kind of bickering that often goes with partisan politics. Most witnesses

seem to advocate a midde ground.

What They Say... Here's what some of the recent witnesses before the Moss subcommittee have to say about excess secrecy:

Prof. Malcolm C. Henderson, Catholic University: Censorship is blocking the flow of information among scientists. The Atomic Energy Commission is doing a good job. While the press wants "everything" released, the Pentagon always wants "nothing" released. AEC strikes a reasonable middle ground.

Nat S. Finney, Washington correspondent, Buffalo Evening News: The government has been slow to encourage popular understanding of nuclear power.

Gerald Piel, editor, Scientific American magazine: Secrecy can be a shield for incompetence and corruption. It should be held at a minimum in government.

Harold C. Grey, atom scientist: Relax secrecy rules so that U. S.

Russia and U. S. "Confidential?"

- The United States and Russia are going to swap copies of government-owned magazines to show each other what life is like in the two nations.
- The U. S. Information Agency plans to come out in July with the first copy of "America Illustrated," a 64-page magazine in color, which will reprint articles from U. S. popular magazines. The Reds have agreed to permit sale in Russia of 50,000 copies per issue. Price: 5 rubles (about \$1.25) per copy.
- * At the same time, the Soviets are planning to distribute a counterpart magazine in the U. S. It will be printed in English, and will be on sale at larger newsstands in the U. S.



Free Facilities Catalog
Find out what American Welding

can do for you. Send for your copy today.

SEND US THE PRINT-WE'LL DO THE REST!

Often the best and most economical way to fabricate circular components—even complicated assemblies—is by welding. Sometimes it is the only way. But how can you be sure that welding is the practical production solution to a specific problem? How can you be sure that some new technique hasn't been developed recently at American Welding that could make welding and fabricating of a special alloy possible?

Here at American Welding is a well-staffed Industrial Products Division ready to serve you. Take advantage of this service today. Simply send us blueprints and specifications. We will be glad to study your particular problem and, based on 37 years' experience, advise you as to whether welding would be your best solution.

THE AMERICAN WELDING & MFG. CO.
120 DIETZ ROAD . WARREN, OHIO

AMERICAN WELDING scientists can take full advantage of the rich U. S. store of technical information held by the government. Stop worrying about Reds. Spies for Russia long ago stole all the secrets necessary to proceed with nuclear work.

Donald J. Hughes, atomic physicist: Excess secrecy breeds insecurity, not security. The U. S. lead over Russia is greater in non-secret research than in areas where everything is closely guarded. Soviet scientists are now well along in nuclear research, and they are no longer dependent upon spies for atom information.

William V. Houston, president, Rice Institute: It is foolish to classify as secret any basic scientific information, as any competent person can discover the facts for himself. Classifying everything "secret" only keeps U. S. industry from using the information. Russian scientists are not deprived of it—they already have it.

Tax Picture:

No easing, maybe even more on business.

Business and the consuming public are not going to get relief from the high war-time corporation and excise taxes this year. And there's a possibility that the total tax take from these levies may be raised by Congress before the end of the current session.

House has already passed a bill postponing for another year a scheduled April 1 drop in the 52 pct corporate income tax and the high excise taxes on such consumer products as beer, whisky, cigarets, and entertainment. Extension of these wartime rates, called temporary when first imposed, postpones a revenue loss of about \$3.2 billion a year to the government.

New Law

Powerful forces in the Senate, as a plan to help small business, are backing a measure sponsored by Sen. Fulbright, D., Ark., to reverse the present corporate tax structure so that the present surtax of 22 pct imposed on profits over \$25,000 becomes the base tax rate, and the present base tax of

30 pct becomes the surtax. This will cost the government \$300 to \$400 million a year, so backers of the plan will first try to push through a version of the plan to make the new surtax 31 pct—thus raising the total corporate tax to 53 pct.

Meanwhile, another new tax plan is brewing in the House. The House Ways and Means committee is studying a "technical" tax amendment bill which would levy new taxes on tape and wire recorders and record players (10 pct) to conform to taxes on phonographs, and an additional tax of one cent a pound on tubeless tires to make up for the tax lost on innertubes.

Hunt Auto Trust

Trustbusters in the government continue to grumble about the sales position of the Big Three auto producers, as the Antitrust Div. of the U. S. Justice Dept. goes ahead with its study of the automobile industry.

Stanley N. Barnes, assistant attorney general in charge of antimonopoly work, says there may have to be action soon if the "economic concentration" among car and truck builders follows its recent pattern. He acknowledges that the smaller producers have improved their status since mergers which created American Motors and Studebaker-Packard were approved.

But he doesn't find any significant change in the percentage of total sales registered by General

WASHINGTON NEWS

Motors, Ford, and Chrysler. Marketing of the Big Three products is still very heavy, he says.

The gloom which this situation appears to create for Mr. Barnes doesn't rub off on Harlow H. Curtice, General Motors president, in Washington to testify before a Senate auto marketing subcommittee. Told that the antitrust chief is concerned about the powers of the Big Three, Mr. Curtice has this comment: "Nonsense!"

Support for Tungsten

A new drive is under way in Congress to extend the government's price support purchase program for domestic tungsten three years beyond the present July 1 cutoff date.

Sponsors of the drive say failure to extend the tungsten purchase program will force every tungsten mine in the country to shut down this summer. Tungsten is needed for jet aircraft engines, ballistic missiles, and in the atomic energy and thermonuclear programs. Failure to keep the tungsten mining industry operating will seriously handicap this country in case of another emergency, the bill's sponsors predict.

Government is stockpiling tungsten, and now says that an adequate inventory exists for mobilization purposes. But once an industry shuts down, it takes many months to get it operating again.

False "SOS" May Be Costly and Dangerous

- They're increasing—26 cases in past three months.
- Causes—Some merely slipshod tests, others accidental, but many are frauds.
- Example—Test by radio manufacturer picked up 1100 miles away, two Air Force planes sent on fruitless mission.
- Result—May be deadened alertness or skepticism to real danger signal.
- " Danger—Real SOS may not receive proper attention.

For

LONGER LASTING BOTTOMS

Specify High MgO Permanente 165!

As THE world's highest quality ramming mix for open hearth bottoms, Kaiser's Permanente 165 contains 165 pounds of MgO per cubic foot!

This unique ramming mix is manufactured by original and patented methods from refractory Periclase grains of 94–96 per cent magnesium oxide. Permanente 165 ceramically bonds itself into a crystalline mass at relatively low temperatures.

The great and growing demand for this superior high MgO ramming material is ample proof that Permanente 165:

LASTS FAR LONGER than other materials.

REQUIRES FEWER REPAIRS on bottoms and banks, thus drastically reducing down-time and repair materials needed.

PERMITS MORE STEEL TONNAGE—and at lower bottom cost!

Let your Kaiser Chemicals sales engineer provide you with research, design and installation service to help you obtain more tonnage, improved quality—and lower operating costs.

Kaiser Chemicals Division, Kaiser Aluminum & Chemical Sales, Inc. Regional Sales Offices: 1924 Broadway, OAKLAND 12, California . . . 3 Gateway Center, PITTSBURGH, Pennsylvania . . . 518 Calumet Building, 5231 Hohman Avenue, Hammond, Indiana (CHICAGO).

Kaiser Chemicals



Pioneers in Modern Basic Refractories

Refractory Brick and Ramming Materials

Castables & Mortars • Magnesite • Periclase

Deadburned Dolomite





Looks Like Labor Peace In Aircraft

Lockheed has already signed . . . Rest in critical stages of negotiation . . . Pension plans biggest issue . . . About 180,000 union members involved—By R. R. Kay.

Racing Incentive

Car conscious southern California is making a bid for new automotive activity with a \$12 million speedway near Los Angeles. It is aimed at making the area a more important racing center. This region now turns out 95 pct of all Indianapolis-type racers and engines. And it's generally considered the biggest U. S. market for foreign and stock car sales.

By mid-year, Los Angeles International Raceway expects to drop the starter's flag on six race and test circuits: $5\frac{1}{2}$ -mile and $4\frac{1}{2}$ -mile road courses, 1-mile and $\frac{1}{2}$ -mile oval tracks, 3-mile speed test course, and a drag strip.

These tracks will feature European Grand Prix sports car and stock car races. The big Indi-

anapolis racers can use the 1-mile oval, and the 3-mile testing circuit is designed for use by stock car manufacturers.

Waterpower Projects

Dams are news in the Pacific Northwest. Prospects appear bright for the proposed Priest Rapids (Wash.) project to start July 1. Plans call for the two dams to yield 1.17 million kw to Northwest lines by 1960. Should the project stay on schedule, the power-hungry metalworking industry is sure to keep pace.

While the public vs private power advocates continue to spar, work is going ahead at Hells Canyon on the Snake River between Idaho and Oregon. Idaho Power Co. now has 500 men and \$2 million worth of machinery working at the Brownlee site, first of three scheduled dams. Construction of the diversion tunnel is underway.

West Coast Shorts

Kaiser Aluminum & Chemical Corp. signed a \$20 million natural gas contract for its Trentwood and Mead plants in Washington. Use of gas will reach eight million cubic feet daily and will be supplemental to electric power.

And at Wenatchee, Wash., Aluminum Co. of America put to work the first series of new pots on its \$2 million expansion program.

Foreign airline purchases of California-made transports: Lock-heed Aircraft Corp. sold 12 turbo-prop Electras to KLM-Royal Dutch Airlines and four 1649A Super Constellations to Linee Aeree Italiane, Italian airline.

◆ AIRCRAFT labor situation is still in the critical stage. Although Lockheed Aircraft Corp. signed on the dotted line, most of the major planebuilders here are still in various stages of very active negotiations. Some 180,000 aircraft and guided missiles workers are involved.

Will there be serious labor trouble? Probably not. The Lockheed contract looks as if it will become the industry-wide formula.

Peace . . . Lockheed is looking forward to two years of labor peace. 22,000 union employees got an immediate wage hike of 6¢ to 17¢ per hr; with a 7¢-per-hour blanket boost set for next year. The package amounts to 15¢, plus pension and other fringe benefits. "This is by far the best contract in the industry," says John Snider, president, International Association of Machinists, Lodge 727.

However, the Lockheed contract doesn't look too appealing to the 70,000 Douglas Aircraft Co. workers. They're insisting on still more money, better pension plan, and improved working conditions.

Pensions At Issue . . . Pension programs seem to be one of the unions' major issues. IAM and United Auto Workers, AFL-CIO, are submitting similar schemes. They both turn thumbs down on any plan tied directly to Social Security. Union leaders claim pension benefits on a tie-in scheme will evaporate as Social Security payments go up over the years.

Probable solution will be a compromise close to the union position.



"I'm on my coffee break!"

The Engineer from Continental Screw Co. ...



... is specially trained to analyze your special fastener needs

Continental Screw leads entire industry in production of special fasteners

Continental is the only screw manufacturer that requires every engineer to have specific experience in the production of ground thread taps and gages. Continental knows that special training in this exacting field is necessary to give each job the skill and understanding it requires.

As a result of this specialized training, Continental produces more special fasteners than any company in the field. Over 6,500 different blueprints are turned out each week by Continental engineers. And the degree of accuracy is so great that Continental cold-forged fasteners are daily replacing expensive screw machine products, improving the product by in-

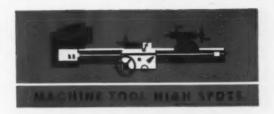
creasing its strength while reducing its cost.

Why not put your special fastener needs in the most experienced hands. Continental's specially trained engineers are always ready to analyze your particular fastener needs. Call Continental today.



Continental Screw Co.

Manufacturers of Holtite Fastenings New Bedford, Massachusetts, U.S.A.



Press Builders' Backlogs Mount

Census Bureau check estimates builders' unfilled orders come to 16 months backlog . . . Report also shows forming and shaping equipment sales hit over \$200 million last year . . . New order volume mounts—By E. J. Egan, Jr.

◆ INFORMATION on sales and shipments of metal forming and shaping equipment—machine tools that don't make chips—doesn't appear as regularly as does statistical data on metal cutting types. When it does turn up, it indicates that this segment of the machine tool industry is a healthy one.

Of the \$840.8 million worth of all types of machine tools that the Bureau of the Census says were shipped last year, forming and shaping machines accounted for \$207 million. And out of the all-industry shipment total of \$1 billion in 1954, "chipless" machines delivered were valued at \$251 million.

On the new business side, builders of presses and other types of forming equipment are doing very well, also. They booked \$378 million in new orders last year for a 129 pct gain over the 1954 total of \$164.8 million. By contrast, manufacturers of metal cutting equipment showed a 75 pct increase in 1955 new orders, compared to 1954 figures.

Press Builders Have Problems . . . But the press builders are having their backlog troubles, more so than the makers of metal cutting equipment. The Government report on the year-end situation estimates that unfilled orders as of December 31, 1955, added up to a 16 month's backlog. It's doubtful that this has dropped in the past 60 days; more likely that it has lengthened by a few weeks.

Mechanical presses continue to account for the bulk of shipments in the metal-forming category; 53 pct of the total last year. Next in line were hydraulic and pneumatic presses with 16 pct; bending and forming machines, 11 pct; punching and shearing units, 9 pct; forging machinery and hammers, 5 pct.

Exports Off Slightly... A section of the Census report pertaining to machine tool exports shows that from January 1 to September 30, 1955, U. S. builders' shipments of all types of metalworking equipment to other nations totaled \$78 million. This was 8 pct less than the total for the comparable 1954 period. Canada, France and the United Kingdom were the principal export markets last year.

U. S. imports of foreign-built machine tools amounted to only \$11.6 million in the first nine

"You're new around here—I'm taking up a collection for the foreman. I'm the foreman."

months of 1955, a drop of 33 pct when compared to the same period in 1954. West Germany and Switzerland were major sources for these imports last year.

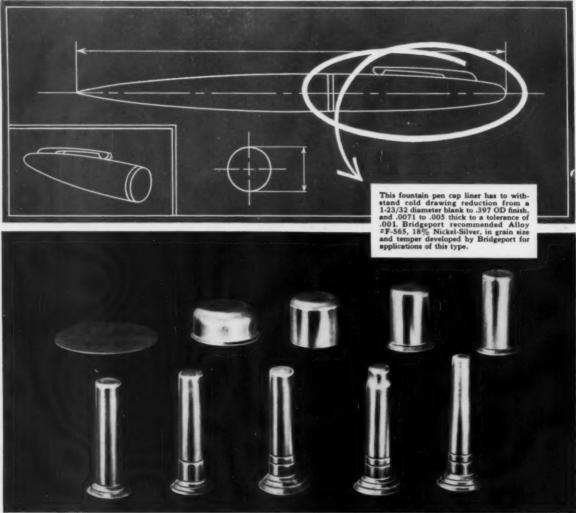
Tests New Program . . . The Air Materiel Command is testing out a new program designed to save time and money in disposing of excess special tooling at the completion of Air Force contracts. The new method would require contractors to give the Air Force from 6 to 12 months' notice of contract completion. It has already been successfully applied to three test cases.

Former system didn't consider what to do with special tooling until the contract was finished. Decisions whether these items should be declared surplus, or used for other Air Force activities, often took several months. This meant extra expense for storage, maintenance and handling, plus delay in getting the tools out of needed space in the contractor's plant.

Plan Seminar... General problem of preventing wear in metal cutting and bearing applications will be considered in a special seminar at Massachusetts Institute of Technology from June 18 through June 28.

Lecture topics will include: structure and properties of solids and lubricants, techniques for use in wear studies (including radioactive tracer methods), bearing friction, temperatures and wear characteristics of cutting tools and grinding wheels, machinability and machining economics.

Matching metal to job with Bridgeport alloys



Parts made by Advance Stamping Co., Detroit, Mich

For better stamping, drawing, cold forming... Bridgeport **HIGH I. Q.*** Strip and Sheet

Let Bridgeport match the metal to the job! Tell us your requirements—both working and service properties—and our Technical Service will be glad to recommend the right Bridgeport High I.Q. alloy

for the job. The right alloy may help you cut production costs and produce a better product. Call your Bridgeport sales office today for a metal recommendation to fit your specific needs.

*High Inner Quality



BRIDGEPORT BRASS

Offices in Principal Cities - Conveniently Located Warehouses

Bridgeport Brass Company, Bridgeport 2, Connecticut

In Canada: Noranda Copper and Brass Limited, Montreal



The Iron Age

SALUTES

Keith P. Rindfleisch

Taking care of metalworkers' steel needs keeps him on the move.

It's a big job to distribute steel where it's needed and when it's needed.

His ability to do just that is recognized from coast to coast.

On a hot August day 26 years ago, a young man with a diploma in business and two years of pre-med training walked into the offices of the Illinois Steel Warehouse Co. He wanted a job as a steel salesman. He got it.

Today, as vice president of sales for the farflung U. S. Steel Supply warehousing organization, Keith Rindfleisch is still setting a hot pace for the warehousing industry.

His career over the past quarter century has been fast moving and all in one direction—up.

Three years after joining Illinois Steel, he was representing that organization back in his home town of Milwaukee.

After a brief interim of selling for Moise Steel Co., Mr. Rindfleisch joined Scully Steel Products in 1937, the year the company became part of U. S. Steel Supply. The energetic young man covered a lot of selling territory in the years that followed.

In 1943, he was called to Cleveland as assis-

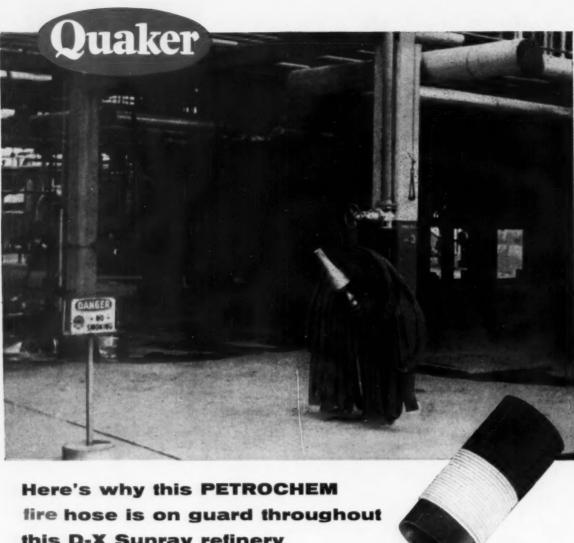
tant district manager for U. S. Steel. Four years later, he went to Pittsburgh as district manager, and in 1951 to Chicago in the same capacity. His ability to cover a lot of ground still holds today.

In times of critical steel shortage, the ability and patience of the steel warehouseman are taxed to the limit. He has pushed himself to the maximum to see that his customers received the best possible treatment under trying conditions.

Outside the office, Mr. Rindfleisch's enthusiasm for extra-curricular activities includes the Sales Executives Club in Chicago and the Union League, and he is an enthusiastic student of the ancient Scottish rite at Old Elm Golf Club.

He still manages to keep pace with four equally fast-moving sons: Thomas, Perry, Donald and John.

Mr. & Mrs. Rindfleisch make their home in Glencoe, a north Chicago suburb.



this D-X Sunray refinery

Get acquainted with your Quaker-Quaker Pioneer distributor. You'll find him of real help-not only for your regular needs - but also in emergency situations requiring extra fast supply. Write for free brochure and name of your nearest distributor.

This hose does more than fight fire. It fights off deterioration by oil and chemicals, stands up to abrasion, resists weather and functions safely under high pressure. Why? Because its oil-resistant Neoprene tube is enclosed in tough, wear-defying Du Pont Dacron impregnated with oil-proof Neoprene . . . this provides a tough, light, flexible hose, resistant to oil, both inside and out. Actually this hose is so strong that it can take pressures up to 500 lbs. and temperatures up to 300°F. ... and so flexible that you can actually knot it. Easy to store, too! Either coiled or folded it takes little space.

These are some of the reasons why D-X Sunray's Oklahoma refinery has this hose . . . the first made for oil and chemical industries, at all fire stations . . . and why it will pay you to consider it in your safety planning. Complete Quaker-Quaker Pioneer line includes hose for every purpose, belting, packing and moulded rubber for every use.

H. K. PORTER COMPANY, INC. QUAKER RUBBER DIVISION Philadelphia 24, Pa. QUAKER PIONEER RUBBER DIVISION San Francisco 7, California

The Iron Age INTRODUCES

Frank M. Daughety, elected vice president and treasurer, Peter A. Frasse and Co., Inc., New York.

Richard S. Rhodes, elected assistant to president, Koppers Co., Inc., Pittsburgh.

Paul E. Noll, elected assistant to vice president, sales, Columbia-Geneva Div., U. S. Steel Corp., San Francisco.

Richard A. Swenson, named supervisor, construction materials, New York district sales offices, American Steel & Wire Div., U. S. Steel Corp., New York.

James K. Sedgwick, appointed manager, Market Development Div., General Sales Dept., American Steel & Wire Div., U. S. Steel Corp., Cleveland; John T. Jung, named assistant manager, Merchant Products Sales Div., Cleveland,

Theodore C. Norris, named assistant manager, Cleveland district sales, American Steel & Wire Div., U. S. Steel Corp., Cleveland.

John W. Ahlberg, named electrical superintendent, Pittsburgh & Conneaut Dock Co., U. S. Steel Corp., Conneaut, O.

David C. Maxwell, appointed assistant sales manager, Needle Roller Div., The Kaydon Engineering Corp., Muskegon, Mich.

Hicks B. Waldron, named manager, manufacturing engineering, Distribution Assemblies Dept., General Electric Co., Plainville, Conn.

Robert G. Page, named plant manager, North Hollywood, Calif., Distribution Assemblies Dept., General Electric Co., Plainville, Conn.

Don H. Rayburn, appointed sales manager, Pocono Fabricators, Inc., East Stroudsburg, Pa.

Gerald R. Bond, named sales manager, production equipment, The National Supply Co., Pittsburgh.

Richard F. Gibbons, appointed general manager, Gardner Transformer Div., Federal Pacific Electric Co., San Francisco.

Robert J. Briemont, named manager, Engineering Service Dept., A. M. Byers Co., Pittsburgh.

Daniel E. Lehane, named manager, sales engineering, The Chromalloy Corp., White Plains, N. Y.

James G. Barnes, named comptroller, Forge and Foundry Div., Chrysler Corp., Detroit; Roderick M. Menoch, named manager, manufacturing services; Charles S. Keller, named manager, forward planning; Robert B. Boswell, named divisional chief engineer.

PERSONNEL



V. J. PAZZETTI, JR., appointed general manager, Bethlehem plant, Bethlehem Steel Co., Bethehem, Pa.



R. T. WHITZEL, appointed general production manager, Aluminum Co. of America, Pittsburgh.



JOHN D. HARPER, appointed general manager, Smelting Div., Aluminum Co. of America, Pittsburgh.



GORDON F. SIMONS, appointed director, engineering and development, The Beryllium Corp., Reading, Pa.





510 South Byrkit Street Mishawaka, Indiana John C. McGreivey, named New York divisional manager, industrial sales, Behr-Manning Div., Norton Co., Troy, N. Y.

Robert M. Fichter, named manager, Product Development Dept., Television-Radio Div., Westinghouse Electric Corp., Metuchen, N. J.

Harrison A. Price, named director, commercial development, Harvey Aluminum, Torrance, Calif.

Rowland G. Stoehr, appointed comptroller, Laclede-Christy Co. Div., H. K. Porter Co., Inc., St. Louis, Mo.

Arthur S. Nippes, appointed assistant general manager, manufacturing, Henry Disston Div., H. K. Porter Co., Inc., Philadelphia.

Alfred J. Bremble, appointed eastern sales manager, Certified Alloys Co. and Aluminum Smelting and Refining Co., Inc., Cleveland.

John Schuch, named general sales manager, Jarrell-Ash Co., Newtonville, Mass.; Gene Roberts, named sales representative. Atlanta office; Robert Alvord, named sales representative, Muskegon district office; Arthur Edwards, named sales representative, Chicago office.

Following appointments were announced by Machine Tool Div., Warner & Swasey Co.: Charles Magill, appointed district manager, Des Moines; Philip A. Kennedy, named district manager, St. Louis; Craig R. Smith, named district manager, Chicago; Otto R. Schubert, appointed district manager, Detroit; Virgil P. Karns, named field engineer, Detroit; Gilbert Lutz, appointed field engineer, Dayton.

Calvin E. A. Solla, named Ohio district manager, Hanson-Van Winkle-Munning Co., Matawan, N. J.

Robert L. Groves, named European district manager, Paris, The Warner & Swasey Co., Cleveland.



LOUIS REISS, treasurer, also named controller, Pratt & Whitney Co., Inc., West Hartford, Conn.



JOSEPH N. YORKE, appointed controller, The Peerless Electric Co., Warren, O.



JOHN E. McGRATH, named assistant manager, sales, St. Louis District, American Steel & Wire Div., U. S. Steel Corp.



CARL HAUGH, appointed Pittsburgh district sales manager, rolling mill equipment, Loewy-Hydropress Div., Baldwin-Lima-Hamilton Corp.



The sturdy Taylor Velocipede frame of 2-inch mild steel tubing is braze-welded on this fixture, with \(\frac{1}{2} \)-inch Anaconda-997 (Low Fuming) Bronze Welding Rod, using the oxyacetylene flame-fluxing process.

"... quickest, most dependable, most economical..."

"Braze Welding with Anaconda 997 (Low Fuming) Bronze Welding Rod is the most practical method of joining steel tubing," The Frank F. Taylor Co.



The stretegically pleced braze welds on Taylor Velocipedes have smooth contours, a good basis for a fine finish—and high strength to stand up in the hardest service. The Frank F. Taylor Co. also makes the famous Taylor-Tot, standard equipment in most young families.

"By depositing smooth flowing and low fuming weld metal, Anaconda-997 (Low Fuming) Bronze Welding Rods promote faster, more uniform work—providing the quickest, most dependable, most economical method of joining steel tubing," says The Frank F. Taylor Company of Norwood, Ohio.

Anaconda 997 (Low Fuming) Bronze is a superior braze-welding rod widely used for the joining of steel, cast iron, and copper alloys by the oxyacetylene process. It is also used to deposit bearing surfaces on steel and iron. Anaconda Welding Rods are sold by distributors of welding equipment everywhere, such as O.K.I. Welding Company, Cincinnati, Ohio, which supplies The Frank F. Taylor Company.

See your Anaconda distributor for help in selecting the exact rod for your job. Or write for Publication B-13. Address: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Company Ltd., New Toronto, Ont.

ANACONDA WELDING RODS



"Accidents don't just happen, they are caused," says a safety expert. But regardless of when or how they occur, you should know that good service can reduce downtime and expensive delays.

In this case, several Acme-Gridleys sustained damages that included broken control panels, cracked top plates, crushed conduits, and broken motor frame castings and guards. Prompt action of our service department got replacement parts to this user quickly—minimized his production losses.

Acme The NAMCO nomeplate on your machine assures envice—in machine assures envice—in energency of normal situations emergency of normal situations emergency of normal where you need it.

THE NATIONAL ACME COMPANY . 175 East 131st Street, Cleveland 8, Ohio

Walter J. Mollenauer, joins administrative sales staff, Vulcan Crucible Steel Div., H. K. Porter Co., Inc., Aliquippa, Pa.

Joseph W. Mullen, appointed representative, Washington area, Metal Carbides Corp., Youngstown, O.

John Paul Jones, appointed design engineer, Mannesmann-Meer Engineering and Construction Co., Inc., Easton, Pa.; Rean L. Nolf, named field engineer.

Gordon R. Lyons, named conveyor sales engineer, midwest sales area, Hanson-Van Winkle-Munning Co., Matawan, N. J.; Richard H. Wolf, named salesman, Dayton area.

Whitney S. Alger, named regional application engineer, south central states, Automatic Transportation Co., Chicago.

John J. Coffey, named district sales engineer, New York office. Thermal Research and Engineering Corp., Conshohocken, Pa.

Harold C. Erskine, named general manager, Castings Div., Aluminum Co. of America, Pittsburgh.

John A. Rado, appointed chief engineer, Electronics Dept., Diamond Power Specialty Corp., Lancaster, O.

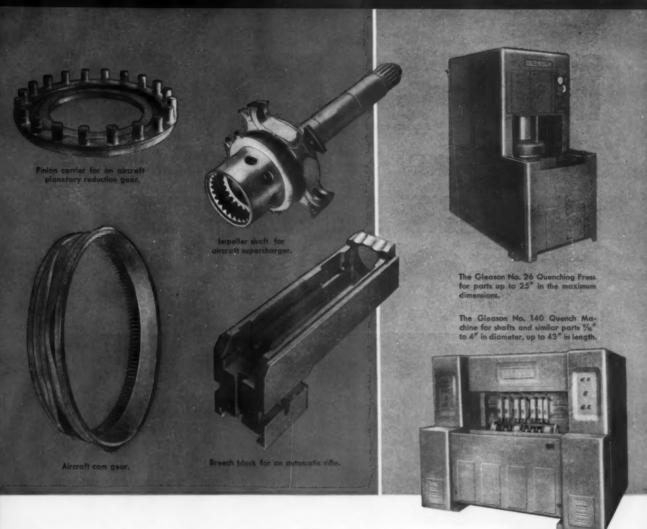
Anthony DeYoung, retired as advertising manager, Whiting Corp., Harvey, Ill.

OBITUARIES

Ferdinand J. Pohlmeyer, chief metallurgist, National Broach & Machine Co., Detroit.

John M. Myers, 61, president, United Aircraft Products, Inc., Dayton, O.

F. Stuart Fitzpatrick, 64, manager, Construction and Civic Development Dept., U. S. Chamber of Commerce, Washington.



How to hold parts like these to <u>close tolerances</u> during quenching

Are you troubled by warpage or distortion of precision parts during hardening?

If you have this problem, Gleason Quenching Equipment can help solve it with substantial savings in costs.

This equipment provides automatic, controlled quenching of flat, round, irregular, or shafted parts insuring alignment and minimizing distortion.

For round, flat or irregular parts up to 36" in the maximum dimension there are three sizes of Gleason Quenching Presses of the type shown at the top right. For shafts or similar parts there is the Gleason Rolling Quench Machine, shown at lower right. It accommodates shafts from $\frac{9}{16}''$ to 4'' in diameter, from 6'' to 43'' in length, and can handle parts with integral cams, gears or shoulders up to 8'' in diameter.

In all these machines the heated part is held under pressure. Flow of the quenching fluid to each portion of the heated part is accurately controlled at preset rates during all stages of the quenching cycle.

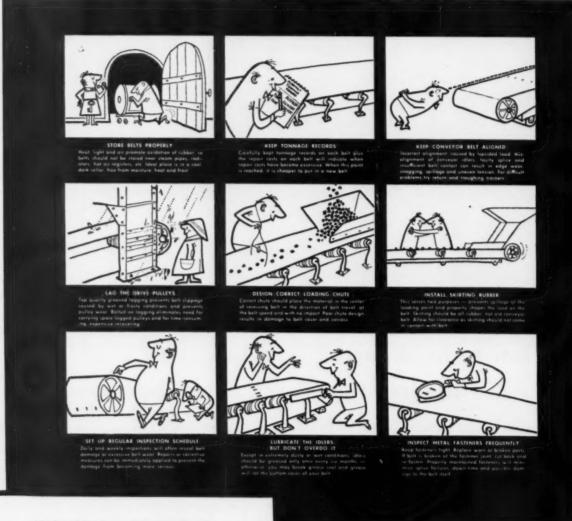
In the Quenching Presses precision dies hold the part in alignment and direct the flow of quenching medium during the quenching cycle. In the Rolling Quench Machine the part is rolled under controlled pressure. Relative pressures applied to the various portions of the part are accurately and automatically controlled.

The use of Gleason Quenching Equipment eliminates the need for any subsequent straightening. This is important for two reasons: (1) It saves one operation, reducing production costs. (2) Hardened parts which do not require straightening have less residual stress. Further information will gladly be sent on request.



MORE CARRY IN YOUR

Free Wall Chart gives



PRODUCTS

CONVEYOR BELTING - CONVEYOR MACHINERY
INDUSTRIAL HOSE - VIBRATING CONVEYORS

VIBRATING SCREENS . DESIGN, MANUFACTURE,

ENGINEERING AND ERECTION OF

COMPLETE BULK MATERIALS HANDLING SYSTEMS
"GLIDE RIDE" THE NEW MOVING SIDEWALK

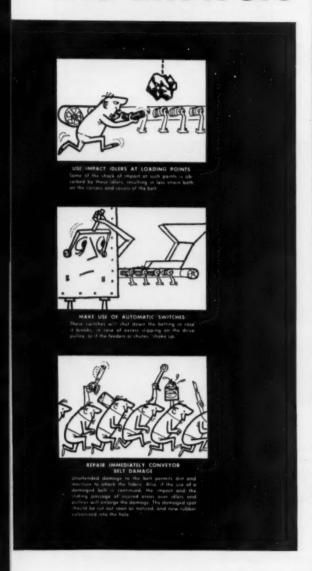
This wall chart, 23" x 33" in two colors, has many valuable tips that will enable you to increase the life of your conveyor belting. To obtain a copy, contact

HEWITT

INCORPORATED . EXECUTIVE

CONVEYOR BELTING

the answers



your local HR Industrial Supply Distributor or write to our executive offices in Stamford, Connecticut.

ROBINS

OFFICES: STAMFORD, CONN.

Which is the best belt for you?

For Mining (Metallic and Nonmetallic)

Maltese Cross for especially severe service. Ajax for general heavy duty service, and Conservo for general light duty service. Exceptionally severe special conditions may require use of specially designed Hewitt-Robins belts such as Shock Pad, CR-50 and CR-70, Raynile and Super-Raynile, Ajax Underground and Monarch Neoprene fire-resistant belting.

For Metal Processing

Maltese Cross for exceptionally severe service. Ajax for general heavy duty service, and Monarch Neoprene for oily service. Maltese Cross Fiberglas Hot Material, Maltese Cross Fabric-type Hot Material and Hewitt Hot Service are especially designed for hot material handling.

For Public Utilities

Monarch Neoprene for oily service, Maltese Cross Hot Material and Hewitt Hot Service for hot material handling. Maltese Cross for especially severe service and Ajax for general heavy duty service.

For Food Processing

Canners and Packers and Hewlite for food handling, Monarch Neoprene for oily service, Ajax Rufftop, Conservo Rufftop and Conservo Transport for package handling. Monarch, Ajax and Conservo for grain and feed handling.

For Materials Handling

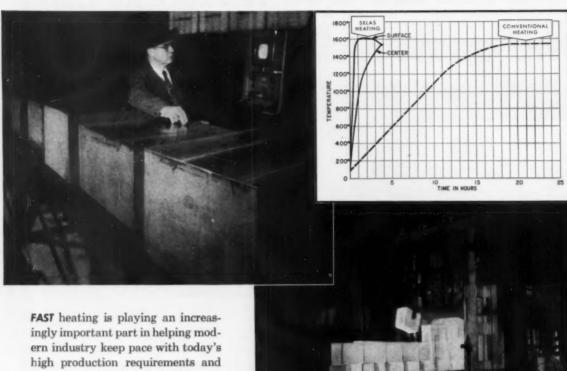
Conservo for portable conveyors. Ajax Rufftop, Conservo Rufftop, Conservo Transport and Hewlite for packaging conveyors.

For Chemical Processing (Including Pulp and Paper)

Maltese Cross for exceptionally severe service, Ajax for general heavy duty service, and Conservo for general light duty. Maltese Cross Fiberglas Hot Material, Maltese Cross Fabrictype Hot Material and Hewitt Hot Service are especially designed for hot material handling.

FOR SERVICE AND INFORMATION
ON BELTING AND HOSE
CALL YOUR LOCAL HEWITT-ROBINS
INDUSTRIAL SUPPLY DISTRIBUTOR
LISTED IN THE "YELLOW PAGES"

FAST HEATING of LARGE STEEL SECTIONS is practical and safe with Selas Gradiation®



FAST heating is playing an increasingly important part in helping modern industry keep pace with today's high production requirements and exacting demands. In addition to the obvious increases in output, FAST heating opens the way to automatic, continuous processing of large steel sections.

FAST: At the Heppenstall Company, Pittsburgh, for example, alloy steel die blocks, 8" to 24" thick, are heated to 1550°F, for hardening, five times faster by Selas Gradiation than by conventional methods.

SAFE: Sonic testing of every Selas FAST-heated die block proves its flawless quality, reproducible uniformity.

PRACTICAL: The completely automatic program control heating accomplished in the Selas gas-fired furnace proves FAST heating is a practical tool for modern steelmakers.

Consider these additional Selas advantages: Precision timing of the heating cycle permits close scheduling of other facilities and manpower. Less labor and lower labor skills are required. Fuel savings of 20%. Quick, economical start-up.

The above furnace was prefabricated by Selas and installed intact in the Heppenstall plant with little or no production interference.

In another installation, Selas Gradiation FAST Heating handles steel sections up to $10' \times 24' \times 3.3'$... weighing 192 tons ... five times faster than by usual practices.

Write Dept. 13 for descriptive data and more information about Selas Gradiation FAST Heating



Heat and Fluid Processing Engineers
DEVELOPMENT DESIGN CONSTRUCTION





How To Select
Machine Tool
Lubricants

- Better than 90 pct of your lubrication requirements can often be handled by four or five grades of oil and by two greases . . . If you use more, chances are it's costing you too much . . . If so, this guide to selection of lubricants is for you.
- ♦ Machine tool builders rightly recommend specific lubricants for their equipment . . . But most times they will agree that a closely allied product will do the job almost as well . . . With their cooperation, dozens of oil and greases in your stockroom may be cut to a few.

By C. R. GILLETTE, Chief Chemist, New Departure Div., General Motors Corp., Bristol, Conn.

What Do You Want In Lube Oils?

- Minimum oxidation
- Minimum gumming
- Minimum sludging
- Viscosity matched to operating conditions (speed, temperature, bearing size)
- Usable on a variety of equipment
- Economical price

◆ SELECTION of lubricants for machine tools is not an easy task. Nonetheless, machine maintenance costs and life depend on use of proper lubricants. So the job must be done.

Machine tool builders' recommendations on lubricants undoubtedly should be implicitly followed where feasible. They know detailed requirements of their equipment better than anyone else. But in the average shop employing machines from more than one builder, the number of recommended lubricants can run into dozens, some used only once or twice a year.

Reduce number of lube oils

Purely as a cost reduction feature, knowledge of what lubricants can be used where obviously is essential. It has been estimated that better than 90 pct of all machine tool lubrication can be handled by four or five grades of oil plus two greases.

Machine tool users generally are fully aware from their own plant maintenance programs of the importance of proper lubrication. It's ob-



Maintaining machine tool accuracy can easily depend upon proper selection of lubricant.

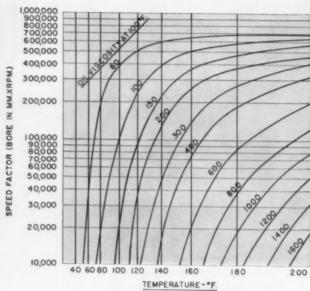


FIG. 1—Best viscosity oil for your machine tool is easily found on this graph.

viously essential to maintain the accuracy and precision built into the modern machine-tool. But choice of lubricants has become increasingly important because of the greater precision and reduced clearances found in present-day equipment.

Lubrication requirements have received serious study by machine-tool builders and are reflected in their lubricant recommendations. One point of general agreement is the importance of using quality lubricants to prevent oxidation, gumming and sludging—and cleanliness to minimize wear.

Match quality against quality

In the majority of ball bearing applications, oil is used as the lubricant. The two major considerations in selection of oils for ball bearings are viscosity and quality.

Quality of the oil selected should prevent gum and sludge deposits and (where necessary) provide rust protection.

Best viscosity should be selected on the basis of bearing speed and operating temperature. Figure 1 is a selection chart developed from field data, customer experience and plant test experience. Observations over many years have tended to confirm its correctness for usual lubrication methods using oil cups, drip feed, wick feed, circulating and central systems.

This chart consists of a family of curves representing the recommended oil viscosity as re-

lated to operating conditions of speed, temperature and bearing size.

Bearing size and speed have been combined into a speed factor. This term is the product of the bearing bore in millimeters and the shaft speed in revolutions per minute. Recommended oil viscosity is selected by locating the point at which the speed factor and operating temperature intersect, then reaching the viscosity directly from the oil-viscosity curves.

As an example, consider a 25 mm bore bearing operating at 10,000 rpm at a temperature of 160° F. Speed factor will be 25 mm x 10,000 rpm, or 250,000. Following across horizontally to the vertical line representing 160° F, it will be seen that recommended oil viscosity is 200 seconds, Saybolt, at 100° F.

Of course, ball bearings can and do operate successfully on oil viscosities that deviate from these recommendations. One example is use of a flood of lower viscosity oil to carry away heat. In another, heavier oil, used to lubricate other equipment is also used to lubricate a ball bearing position. But under normal operating conditions, use of such a selection chart as shown in Fig. 1 is suggested.

Grease is frequently preferred in ball bearing positions. With the exception of spindle bearings, most applications are at slow to medium speed, are moderately loaded, and operate at moderate temperature. These conditions present little problem from a lubrication standpoint.

But the quality of the lubricant will influence the frequency of relubrication.

There are many types of greases, each type having its own special properties. Some of the principal types are: petroleum oils thickened with calcium soap; sodium soap or mixed soaps; petroleum, diester or silicone fluids thickened with lithium soaps; and a more recent development—grease containing inorganic thickening agents.

The familiar "cup greases" are composed of petroleum oils thickened with calcium soap. They are insoluble in water and may be used for moderate speeds and temperatures. They are not generally recommended for high temperatures since the water with which they are normally stabilized evaporates, causing separation of the soap and oil. Some types are available with stabilizing agents other than water, which permit their use at somewhat higher temperatures.

Compounded for HT Use

Sodium soap grease consists of petroleum oil thickened with sodium soaps of various fatty acids. They have been developed for anti-friction bearing use and are suitable for wide ranges of both speed and temperature. In general, they offer good rust protection. But in the presence of excessive amounts of water, they tend to emulsify and wash out of the bearing.

Most common example of mixed-base greases are those containing both sodium and calcium soap. Intent of the blend is to combine some of the advantages of both—particularly the smoother, buttery consistency of the cup grease with the higher temperature characteristics of the sodium soap grease. In general, most of the better known anti-friction bearing greases are either of the sodium soap or the mixed-base types.

Lithium soap greases again are of the petroleum oil variety. They combine several desirable properties not found in other greases. In addition to water resistance they melt at a fairly

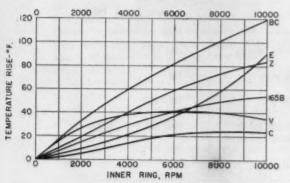


FIG. 2—Even conventional greases differ widely in temperature rise they allow at various speeds.

You Can Standardize-

Your Machine Tool Builder Will Help

- Check bearing bore. Determine speed range of bearing shaft. Calculate speed factor.
- Establish best operating temperature.
- From Fig. 1, determine what viscosity your lubricating oil should have for each machine.
- Group machines according to oil viscosity required.
- 5. Contact lubrication engineer for recommendations.
- Clear recommendations with machine tool builder if there's any doubt.

high temperature. While their high temperature characteristics are not usually as good as sodium soap greases, they perform very well at temperatures up to 200° to 225° F.

Lithium soap greases have also been produced using various organic di-esters instead of the usual petroleum oils. These have been developed principally for aircraft applications and are characterized mainly by a wider temperature range than can be obtained with the petroleum oil type. Future developments may show some advantages for extremely high speed applications.

Greases have been developed using silicone fluids in an effort to further extend the high temperature range. Originally products were thickened with lithium soap. More recently non-soap thickeners have been used. While these products are the best of the high temperature greases to date, they still are inferior to petroleum products in lubricity and load-carrying ability, and thus are not suitable for heavily loaded applications. Current research may improve these characteristics.

Considerable development work is being conducted in connection with the substitution of inorganic thickening materials for the commonly used soaps. Such materials as bentones, attapulgite, and silica flour have been used. These products are characterized by their non-melting properties due to the nature of the thickeners.

Most products of this type have shown more

"Speeds with current greases are limited . . . Development of 100,000 rpm greases is needed."

resistance to shear than soap thickened greases, resulting in higher torque and higher operating temperature. There also is some indication that they do not release oil as readily as conventional greases, which may make them somewhat less suitable for ball bearing applications.

Contrary to what might be expected, this type of thickener does not appear to cause serious wear, providing the particle size is fine enough. Further research may correct some of the present criticisms and result in products with a greater operating temperature range than present soap-thickened greases.

Major grease lubrication problem in machine tools involves grease lubricated spindles. With some exceptions, present limiting speeds for grease lubrication are approximately 3500 fpm for steel separators and 5000 fpm for non-metallic separators. For example, in a type 3203 bearing with inner ring rotation, this is equivalent to approximately 15,600 rpm and 22,200 rpm respectively. For a type 3210 bearing—5800 rpm and 8300 rpm respectively.

Watch temperature rise

To be suitable for high speeds, the grease must be able to keep the temperature rise to a minimum. This requires such properties as low torque, low resistance to shear, channeling, low fluid friction, etc. Such a grease must have the additional property of releasing sufficient oil over the period of its life, to supply continuous lubrication.

A channeling type grease appears essential for high speed spindle applications. In Fig. 2, the sodium soap-petroleum oil (grade C) is an outstanding example of this type.

The V and the 165B greases of Fig. 2 are also sodium soap-petroleum oil greases, but operate at slightly higher temperatures. The Z grease is a lithium soap type advocated widely for general purpose lubrication. The E grease is the lithium soap di-ester grease developed primarily for aircraft applications. The BC grease is included on the chart only to indicate the extremes of temperature rise possible with conventional greases.

While speeds with current greases are limited to the values mentioned earlier, future development undoubtedly will permit them to be increased appreciably. At present existing knowledge is extremely limited regarding the fundamental factors involved in high speed lubrication. This knowledge is especially valuable in

certain military applications where grease lubrication is needed at speeds of 2,000,000 DN—equivalent to a type 3204 bearing running at 100,000 rpm.

As more knowledge becomes available, greases will be produced which will extend considerably the speeds at which grease lubricated bearings may operate. Such a development could well extend the usefulness of grease lubrication in future machine tool designs.

Lubrication of machine tool components other than ball bearings is an equally important problem. However, a lubrication analysis covering all the highly diversified equipment found in a large shop can not be phrased as specifically as in the case of ball bearings.

Standardization troubles

There is some similarity between almost all types of machine tools. They may have in common: spindles, hydraulic systems, slides and ways, gear boxes, plain bearings, ball bearings and other components. But differences in design, bearing clearances, loads and other factors make it difficult to establish simplified and standardized lubrication practices.

Despite this, it has been estimated that better than 90 pct of the lubricants used for machine tools can be represented by four or five grades of oil and two greases. A study of the equipment builders lubrication recommendations discloses 50 or more different grades of lubricants needed to satisfy all of their specific requirements.

Strides have been made by tool builders in designing equipment for lubrication by a few standard oils and greases. Even more emphasis on such standardization will win friends fast.

Selecting Lube Oils

(Other than ball bearing)

Part	Oil Viscosity* (seconds, Saybolt, 100°F)
spindles, bearing	42 – 125
spur gears	300
worm gears	700 – 1000
hydraulic and cir- culating systems	150 - 300
ways	low

^{*} Lubricant recommendations are not intended to supersede specific tool builder recommendations, but are a guide only to possible standardization.

For nuclear reactors-

- ◆ Zirconium is a metal you're bound to hear more and more about . . . Right now, its use is pretty much limited to nuclear reactors . . . But some of the outstanding properties of the metal slate it for a bright industrial future.
- Welding zirconium is an important part of its fabrication . . . Two methods have been proposed . . . This article tells why resistance welding seems to be the better bet.

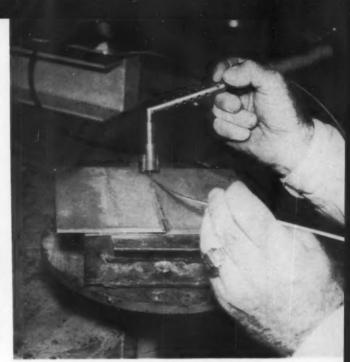


FIG. I—Fusion welding setup for welding zirconium uses an inertshielded - gas - arc tech nique.

How to Weld Zirconium

By HUGH JUSTIS and CHESTER LAWRENCE,

Nuclear Manufacturing, Research and Development Group,
The Glenn L. Martin Company, Baltimore

◆ ZIRCONIUM is a metal with a very bright future. Although some of its more important applications have been shrouded for reasons of security, its long-term importance to industry is a certainty. It is a primary construction material for nuclear reactors.

As a metal, it has high strength and remarkable corrosion resistance up to about 600°F. But its major selling point—in nuclear parlance—is its low thermal-neutron cross section. Translated into more recognizable terms, this has to do with the metal's ability to resist radiation damage.

Zirconium is fairly easy to fabricate. Modern fabrication must, as a rule, also consider weldability. In this respect, commercially available zirconium is a good metal for welding by both resistance and fusion methods.

Fusion welding of zirconium requires a protective atmosphere in the weld area to prevent contamination. Resistance welding does not. For this reason, resistance welding appears to be more practical for the fabrication of zirconium assemblies where design factors permit.

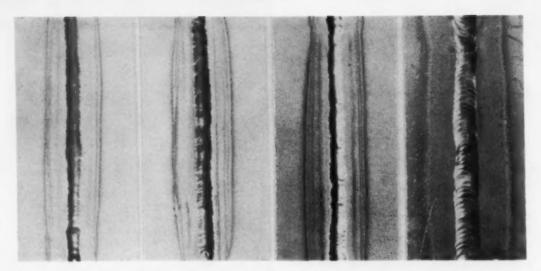
Studies of the weldability of zirconium were undertaken by the Glenn L. Martin Co., Baltimore. They were prompted by the increased availability and greater use of the metal as a structural material in nuclear applications. Such applications made a more extensive knowledge of zirconium's welding properties essential.

Inert atmosphere needed

The nature of impurities, as they exist in zirconium, alter the metal's mechanical properties considerably and have indirect effects on the properties of its welds. The need, during fusion welding, to surround the weld area with an inert atmosphere is a result of the metal's high affinity at elevated temperatures for atmospheric gases.

The material used in these tests was coldrolled strip (annealed base) in thicknesses of 0.025, 0.040, 0.080, and 0.190 in. It had a hardness of 90 Rockwell 15T and a tensile value of 92.500 psi.

The fusion welding program made use of an



Above: FIG. 2—Four sample zirconium butt-welds illustrate some of the typical results obtained.

Right: FIG. 3—Cast structure of weld-deposited metal shows marked contrast with parent metal. 75X

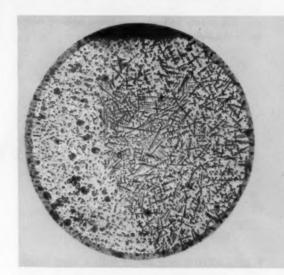
TABLE I

Tensile Values of the Welds

(In psi)

Specimen Plate 1 Plate 2 Plate 3 Plate 4 Plate 5

a 80,400 85,600 84,200
b 82,500 82,900 69,700 68,500
c 85,400 68,900 68,100



inert-shielded-gas-arc torch with an argon atmosphere passing through the torch nozzle. Helium was passed through a trailer nozzle.

The filler wire was sheared from the 0.080 in. strip material. Plates of 0.080 and 0.190 in. material were sheared to 4 in. x 6 in. specimens, with a 45 deg chamfer ground in each plate. Both plates and filler wire were chemically cleaned in a solution of concentrated HF.

During welding, the plates were placed on a backup-purging chamber in which an inert atmosphere of helium was maintained at a constant flow rate. The plates were spaced with a 1/32 in. gap and inert-shielded-gas-arc welded with a constant gas flow through the torch, trailer, and backup-purging chamber.

The welding setup is shown in Fig. 1. The voltage was 18-20 volts and the current ranged approximately from 60-140 amperes. The volt-

age and current were controlled by the use of a foot pedal rheostat, but no continuous recording of either was made.

Where an inert atmosphere was properly maintained, the weld-beads resembled weld-beads of titanium. Where an inert atmosphere was not properly maintained, the weld-beads oxidized. Fig. 2 shows several typical zirconium butt-welds.

Fusion welding limited

A transverse measurement of a section through the weld showed, on a Rockwell 15T scale, a hardness of 88.5-90 in the parent material and 89-91.5 in the weld-deposited metals. Tensile values of the welds are shown in Table I.

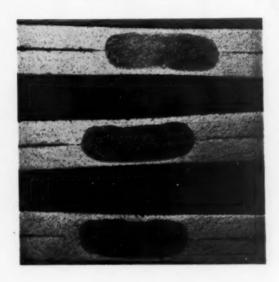
All tensile specimens failed in the base-metal heat-affected zone near the welds. All fractures

TABLE II Optimum Welding Schedules

Machine Settings	0.025 - 0.025	0.040 - 0.040
Electrodes	Elkaloy "A"	Elkaloy "A"
Radius	3 inches	4 inches
Weld Phase Shift	42%	47.5%
Constant Low Electrode Force	780 psi	833 psi
Weld Cycles	2	2
Transformer	Off	Off
Impulses	1	1

^{*} The schedules are those of specimens having the best shear properties and metallographic structure.

Below: FIG. 4—Three sample spot-welded nuggets show almost perfect definition and complete fusion.



were found to be sound. The elongation of the weld specimen was so low as to be unmeasurable. The welds were found to be too brittle for bend testing.

Fig. 3 is an enlargement of a section of No. 4 weld, showing the cast structure of the weld-deposited metal and the parent stock interface. The weld deposit seems to have eliminated substantially the spheroid constituents of the parent metal.

Optimum fusion welding procedure appears to require an entirely enclosed inert atmosphere. These tests tend to discourage the application of fusion welding to zirconium structures which require a ductile welded joint.

For resistance welding, a Sciaky PMCo-2ST-56-100 3-phase welder was used. Test plates were made of 0.025 and 0.040 in. material. Plates were overlapped 1 in. for welding. After

sandblast cleaning, the material gave a surface resistance of 200-250 micro-ohms.

Efforts to obtain the proper nugget involved the use of a variety of electrodes with different electrical and mechanical characteristics— Elkaloy "A," Mallory "3," and Mallory "100" among them. Various tips and procedures were also tried.

Elkaloy "A" electrodes with a 4 in. radius for 0.040 in. stock and a 3 in. radius for 0.025 in. stock gave the most suitable nugget—a 60-90 pct penetration and a nugget diameter of about $4\frac{1}{2}$ times the stock thickness. The electrodes have a tendency to pick up zirconium and require redressing periodically.

The Rockwell hardness values in Table III were converted from readings on a Tukon Tester with a 1 kg load. The readings were taken parallel to the major axis of the nugget. The wide variation in hardness results from the metal's distinct metallurgical phases.

Several spot-weld nuggets on 0.040 in. material are shown in Fig. 4. The nugget is well defined and completely fused.

These results support the contention that resistance welding of zirconium is relatively easy and gives good results when the proper welding schedule has been established. No protective atmosphere is needed, but the stock should be cleaned chemically or mechanically beforehand to insure the best possible welding conditions.

TABLE III

Rockwell Hardness Values of Spot Welds Selected at Random

0.025 - 0.025 Specimen

0.040 - 0.040 Specimen

Distance from Center of Nugget (inches)	Rockwell Hardness Equivalent	Distance from Center of Nugget (inches)	Rockwell Hardness Equivalent
0.0200	C29.5	0.115	C33
0.150	B96.5	0.085	C29
0.120	C29.5	0.055 in weld	C35
0.100	C51.5	0.025 in weld	C39
0.085 in weld	C31	0.010 in weld	C34
0.065 in weld	C29	0.035 in weld	C34.
0.040 in weld	B96	0.070 in weld	C38.
0.015 in weld	C32	0.100	B98.5
0.015 in weld	C28.5	0.130	B98.5
0.035 in weld	C33	0.165	C20
0.060 in weld	C33		
0.085 in weld	C31		
0.090	C36		
0.115	C29.5		
0.140	C26		
0.175	C23		
0.210	C40.5		

Can Specimen Size Affect Tensile Testing?

By EDWARD DUGGER, Senior Project Engineer and ALTON BRISBANE, Project Engineer, Materials Laboratory, Wright Air Development Center, Dayton, O.

- ◆ Tensile testing is of value only when it is accurate, dependable . . . Inaccurate results can sometimes lead to harmful and costly errors.
- Is accuracy affected by specimen size? As a rule, it is not—at least for unnotched specimens...
 But tests with notched specimens tell a different and very important story.

◆ AS ULTRA HIGH strength steels continue to grow in importance and popularity, there is a corresponding need to know more about their mechanical and physical properties. Much of this information is gained through specimen testing. But to be meaningful, such tests must be highly accurate.

An array of metallurgical factors are constantly being subjected to test. Important among these are the effects of heat treatment, hydrogen content, metal cleanliness, and notch sensitivity. At least a part of the evaluation of these various factors is accomplished by the use of tension tests.

Nowadays, tensile specimens of various sizes are being used for test purposes. But the question arises: "Are all of these specimens equally valid?" Is it possible that specimen size may somehow affect test results?

A test program primarily intended to determine the possible effects of specimen size, especially in notched bar tests, was recently conducted by Wright Air Development Center, Dayton, Ohio.

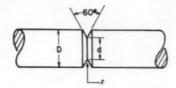
Three heat treatments used

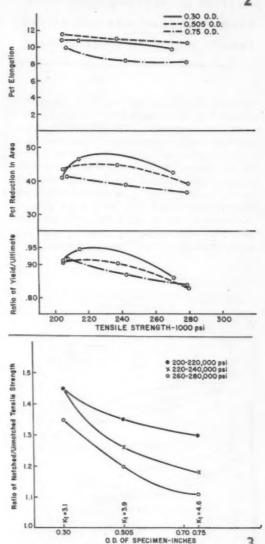
The material used in the investigation was $\frac{1}{8}$ in. diam SAE 4340 steel. Specimen blanks were normalized at $1600^{\circ}F$ for 4 hours, rough machined to within 0.040 in. of the finish size, and then heat treated in accordance with the three cycles shown in Table I.

These heat treatments resulted in tensile strengths that could be classified in three ranges: (1) 200-200,000 psi, (2) 220-240,000 psi, and (3) 260-280,000 psi. Specimens were ground to the finish size after heat treatment.

Three sizes of specimens with outside gage

Type of Specimen	D-IN.	d-IN.	Stress Concentration Factors	Notch Radius r-IN.
			3.1	0.010
	0.30	0.212	3.9	0.006
			4.6	0.004
			3.1	0.017
NOTCHED	0.505	0.357	3.9	0.010
			4.6	0.007
			3.1	0.025
	0.75	0.530	3.9	0.015
			4.6	0.010





diameters of 0.300, 0.505, and 0.750 in. were tested. Notched specimens had root diameters of 0.212, 0.357, and 0.530 in. respectively. These conditions provided a 50 pct reduction in cross-sectional area.

The notch was a 60 deg V-type notch, with the notch radii varied to give theoretical stress concentration factors (K_t) of 3.1, 3.9, and 4.6 for each specimen size. Notch specimen geometry and the radii needed to give these factors are shown in Fig. 1. Both radii and root diameters were measured with a toolmaker's microscope.

All tests were run in triplicate, and the specimens were loaded at a rate of 30,000 psi per minute. Stress-strain curves for unnotched specimens were obtained autographically. Elongation values were based on gage lengths four times the diameter of the specimen.

Basically, there was no difference in unnotched tensile strength which can definitely be attributed to specimen size. Some trends—although minor—were noted for reduction in area and elongation (Fig. 2). Above 200,000 psi, the smallest specimen (0.300 in.) gave the greatest reduction in area. The largest specimen (0.750 in.) gave the least.

Test affected by specimen size

The ratios of yield to ultimate strength in the unnotched specimens show the same trend as that noted for reduction in area. As for the ratio of yield to ultimate at the 280,000 psi level, there is no difference due to size.

The notched tensile strength of 4340 is definitely affected by the size of the specimen tested. Fig. 3 shows that as the outside diameter of the specimen increases, the ratio of the

Results on notched specimens show that specimen size affects tensile property measurement.

notched strength to the unnotched strength decreases for all strength levels. Ratio is used in order to compensate for differences in unnotched tensile strength due to heat treatment.

The results bear out the fact that an increase in the theoretical stress concentration factor occurs with increased specimen size when the ratio of overall area to notch area is constant. This would normally reduce the notch strength. As shown in Figs. 4 and 5, the notch ratio still decreases with increasing specimen size even at the same stress concentration factor.

The difference between the two largest sizes, 0.505 and 0.750 in., becomes less as $K_{\rm t}$ increases. These figures indicate that a 0.505 in. or larger diameter gives more conservative results than does a 0.300 in. diameter.

Fig. 6 shows that the notch strength of the material has not reached its maximum at an unnotched tensile strength of 280,000 psi for K_t through 3.9 for any of the three sizes tested. In addition, the maximum has not been reached for $K_t=4.6$ for specimen sizes of 0.300 and 0.750 in. With the 0.750 in. specimen, a K_t of 4.6 appears to be rather favorable. But according to Fig. 4, this condition must be tempered by the fact that the ratio of notched to unnotched is quite low.

While the notch strength decreases for increasing stress concentration, for design purposes a higher stress concentration may be more desirable depending upon the strength level. For example, it is shown in Fig. 8 that a

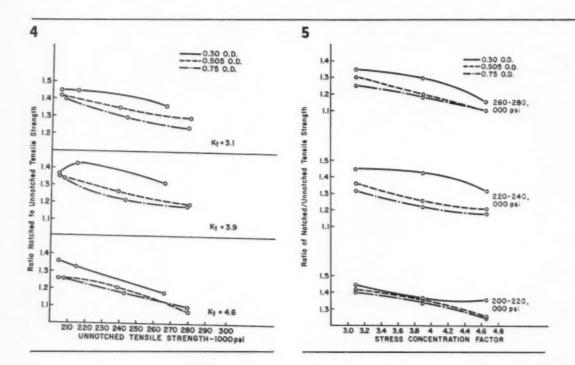
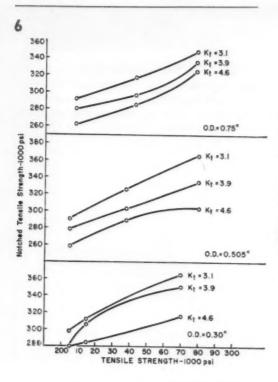
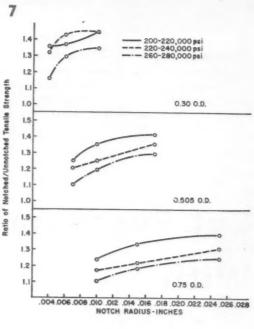
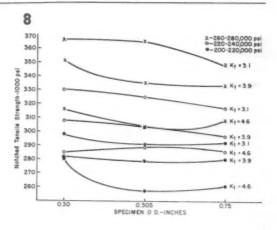


TABLE I

Hardening	Time				
Temp.	at heat,		Tempering	Time,	Cooling
Degrees, F.	Hours	Quench	Temperature, F.	Hours	Medium
1575	11/4	Oil	1000	11/2	Air
1575	11/4	Oil	800	11/2	Air
1475	4	Oil	450	8	Air







 $\rm K_{t}$ of 4.6 at the 260-280,000 psi level gives a notched tensile strength of 308,000 psi for the 0.750 in. diameter. On the other hand, a $\rm K_{t}$ of 3.9 provides a notched strength of 296,000 psi in the 220-240,000 psi level. The same holds true for each size specimen in varying degrees.

Since the theoretical stress concentration factor is a function of the notch radius and specimen size, two curves are presented to show the relationship of notched radius to the notch ratio. The curve shown in Fig. 7 is based on a constant strength level for each size. It follows the expected trend of increased notch ratio with

increasing notched radius for each size specimen.

Results obtained on notched specimens indicate that specimen size is a factor in the tensile properties of such specimens. The 0.300 in. diameter specimen used in many investigations gives somewhat higher tensile results in the strength range above 200,000 psi than do 0.505 and 0.750 in. specimens. For this reason, it would be safest to standardize the 0.505 in. diameter for purposes of notched tensile testing. While some differences are small, this occurs in every case.

- An ingenious new single-form, 14-part order handling system gives this Cleveland metalworking firm complete control over order-production-invoicing operations . . . Initial writing puts basic data at all needed points, with no copying.
- ◆ Customer orders now move faster through the paperwork mill . . . Copying errors are eliminated, direct work flow maintained, inventory control provided for . . . Materials purchased on orders can be substantiated.

Cut Paperwork With A Single-Form System

♦ ORDER-HANDLING formerly required considerable duplication of common information by various departments at American Tank & Fabricating Co., Cleveland. Preparation of four separate forms was necessary in processing a job from receipt of order through to customer billing.

Combining these four separate forms into one has resulted in a system for complete control of order-production-invoicing operations from just one original writing.

The old, quadruple approach began with the writing, on receipt of the customer's order, of a two-part shop order. One copy went to the plant and the second copy was placed in the department file. Second step was to type or write by hand a cost summary sheet, copying the original information. This was attached to the shop order copy.

Two-part requisition

Upon receipt of the shop order, the plant prepared a two-part material requisition. One part was sent to the purchasing department for outside purchases and the other was sent to the stock room to requisition material in stock.

The billing department then typed the customer's invoice in the required number of copies and filed them until the job was completed and shipped. At that time, the form was removed from the file, priced, extended, and mailed to the customer.

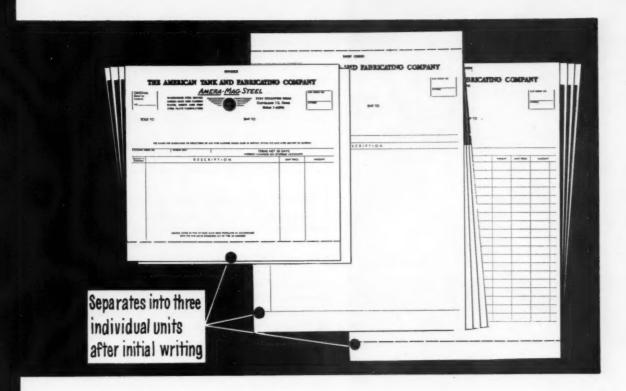
Though the sequence of the actual work flow was simple and direct with this method, much time was wasted by the individual departments in writing out repetitive information. The possibility of errors or actual misinterpretation in copying customer specifications and other information was ever present. In addition, the procedure lacked systematic control for internal order follow-up for scheduling and inventory.

To overcome these disadvantages, the company developed the new system based on grouping the four previous forms into a combined multiple part set. With the assistance of Moore Business Forms, Inc., a 14-part combination form was worked out, designed for complete control of the entire record-keeping operation.

The form was designed so it can be separated into three individual units, complete with carbons, after the initial writing. All of the essential repeated information appears on each part.

First unit to be separated after the initial writing is the invoice set. This includes the file copy of the invoice, which is printed on card stock. This complete five-part unit is then filed in the billing department until the finished job has been shipped and the cost summary sheet has been returned from the factory.

Information from the cost summary sheet is then transferred to the invoice and the first four copies are mailed to the customer. The last part (on card stock) is filed by invoice number as a permanent record of the transaction.



The cost summary sheet, longest sheet in the 14-part set, is a single page on which the factory keeps an accurate record of time and labor and material charges. It is sent along with the remaining parts of the form to the plant where the planning and scheduling take place.

Here, the form is again separated into two units. One is the four-part material requisition set on which the foreman writes in by hand the list of materials needed. He then distributes these, part 1 going to the stock room, part 2 to purchasing, part 3 for shop office file and inventory control. Part 4 is an alphabetical copy, attached to, and filed with, the cost summary sheet.

Shop order sequence

The remaining section of the Speediset, the shop order, consists of four parts in addition to the cost summary sheet. Part 1 is the warehouse file copy. Part 2 is the purchasing dept. file copy. Part 3 is the shop office file copy and part 4, the commodity file copy. The cost summary sheet is then returned to the billing department with a copy of the material requisition.

From the cost summary sheet and the substantiating material requisition copy, the billing department prices, summarizes, and enters the cost-to-consumer totals, and then enters the completed information on the invoice set.

The invoice is then mailed to the customer and substantiating reference copies are filed.

Above: INITIAL WRITING puts essential repeated information on each copy of these three (here separated) units of the new 14-part form. Shown are shop order, invoice, materials requisition sets.

Why The New System's Better-

- Four previous forms are combined in one.
- Direct work flow is maintained.
- Unnecessary copying of data by production departments is eliminated.
- Possible copying errors are eliminated and misunderstandings avoided.
- It provides for inventory control.
- Actual materials purchased for each order can be substantiated.
- It provides adequate control for order scheduling and follow-up by the factory.



Left: ULTRASONIC inspection of steam turbine bolt threads spots flaws as small as 0.050 in.

- Possibility of equipment failure in service always is disturbing . . . In high temperature, high stress applications, complete disassembly and detailed parts inspection usually is needed to maintain desired safety factor.
- Ultrasonic inspection can cut costly downtime and detect flaws long before they lead to failure
 . . And with a systemized approach to establishing inspection standards, ultrasonics is reliable and accurate with reproducible results.

Ultrasonic Field Inspection Spots Danger Early

By R. N. HAFEMEISTER,

Foreman

Non-Destructive Test Section, Allis-Chalmers Mfg. Co.,

Milwaukee

◆ FROM A FLEDGLING UPSTART a few short years ago, ultrasonic inspection is rapidly growing into a major testing method suitable for an astonishing variety of practical applications. No doubt it has grown quickly in use, perhaps faster than any other inspection technique.

There's also little doubt the field could expand at even a greater pace. Determining factors include present technical limitations (there are a few), and uncertainty among some metalworkers that ultrasonics can be applied successfully to their particular test situation.

At Allis-Chalmers any hesitancy that may have existed about its suitability has been dispelled. To overcome it, a generalized approach to ultrasonic inspection has been developed. This means that in any proposed test application, a standard plan is applied to establish: 1) Suitability of ultrasonics as a specific inspection method. 2) Its accuracy and reliability under standard test condi-

tions, 3) Defect standards, including extent and location of smallest measureable defects, and 4) Conditions that would tend to make the test unreliable.

This standard approach is now in day-to-day use at Allis-Chalmers. Its success can be measured by actual case histories.

No special cleaning

Field inspection here of certain steam turbine parts is currently standard procedure with ultrasonic equipment. Service-provoked defects (fatigue cracks for example) down to 0.050-in. deep are spotted ultrasonically without difficulty. Contrary to expectations, special cleaning of test surfaces is not essential—a wipedown is sufficient. Inspection is carried out as a routine maintenance procedure, at the time regularly assigned for turbine shutdown.

Fatigue cracks in large bolts and studs are con-

sistently and accurately picked up before fracture occurs. Possibility of excessive downtime and costly repair is reduced to the vanishing point. No other inspection method has been found to answer the question: Will there be a fatigue failure?—and answer it easily, with sufficient accuracy and timeliness to allow preventive action.

In arriving at this new application of ultrasonics, considerable research preceded a practical and continuing inspection program. Primary concern initially was steam turbine bolts and studs, which were used throughout development work.

Studs and bolts are threaded at both ends. They measure from 2 to $2\frac{1}{2}$ -in. diam and from 18 to 30-in. long. One end is visible when installed, but flaws must be detected in both threaded ends.

Maximum benefits are realized only if the studs are inspected with the steam turbine in operation. Practical considerations establish a minimum standard of inspecting with equipment shut down, but with bolts and studs still in place. Primary advantage of this arrangement is ease of replacing any bolts found defective. Need for waiting until a scheduled shutdown, or the possibility of causing an unscheduled shutdown, is thus eliminated.

Anticipated obstacles were many. All but two were effectively solved. For example, thread roots might reasonably be expected to give an oscilloscope indication indistinguishable from the pip caused by a crack. This fear subsequently proved unfounded.

Inspect after cooling

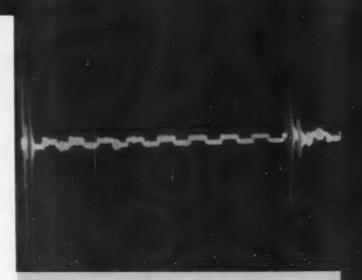
One limitation developed immediately: present maximum permissible temperature of the probe crystal is in the 250° F range, somewhat lower than operating temperature of the steam turbine. Hence the high temperature unit must cool before a reliable ultrasonic inspection can be made. The second limitation is detailed later.

Bolts securing upper and lower turbine casings are high strength, temperature resistant steel manufactured to close tolerances. Removing bolts for inspection is not feasible because of the danger of flawing during reassembly. If a crack develops under these circumstances, it would go undetected until the next inspection, or more ominously, until it failed under load.

Ultrasonic equipment consists of a Sperry Reflectroscope, type UR, equipped for either one or two probe operation. Available frequencies are 0.5, 1.0, 2.25, 5.0 and 10.0 megacycles. Crystal sizes include ½-in. square, ½-in. round, 1-in. square and 1-in. round.

Before actual test work began, a minimum flaw depth of 0.050 in. was established. At this point, the flawed bolt is not considered dangerously near failure. At the same time, the flaw is sufficiently deep for differentiation between it and the thread roots.

Next phase of the investigation correlated actual test work with what was already known



Above: FIG. 1—Standard is flaw-free bolt, 18½-in. long. In tests shown, a ½-in. probe was employed at 10.0 megacycles.

Below: FIG. 2—Arrow locates artificial flaw (1/8-in. deep saw cut) 14 in. from bolt end.

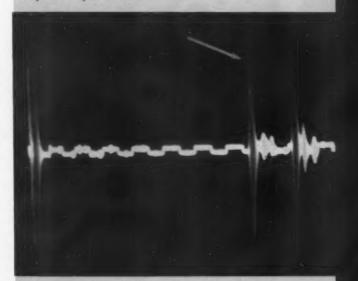
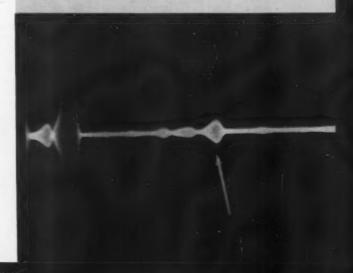


FIG. 3—Actual 0.060-in. deep flaw in bolt withdrawn from service shows clearly.



To Establish Ultrasonic Inspection Standards—

- Determine minimum acceptable standards (test conditions, extent and location of defects, etc.)
- 2. Match required standards against instrument sensitivity
- 3. Run controlled tests to obtain reference data series
- 4. Run test series on known and naturally flawed parts
- 5. Correlate (4) and (3) within accepted standards of (1)
- 6. From (4) and (3) establish standards, including conditions rendering the inspection unreliable

about the behavior of steam turbine bolts. Bolts and studs first were tested with artificial defects to establish reference data. Then bolts with natural defects were inspected.

Initial tests were carried out in conjunction with the Allis-Chalmers research division. Bolts selected at random from stock were subjected to extensive ultrasonic inspection prior to inflicting artificial defects. Reflectograms taken from both bolt ends provided a permanent record of the original internal condition.

All four crystal sizes available were tested at frequencies of 2.25, 5.0 and 10.0 megacycles. Surface preparation was minimized, to conform most nearly to field test conditions. Under no circumstances did cleaning exceed a mere wipedown or brushing.

Flawed deliberately for control

Bolts were deliberately flawed with thin saw cuts ranging from 0.0625-in. to 0.125-in. deep. Flaws located in the threaded section at varying distances from bolt ends were carefully measured.

Threads on all bolts were then masked from end to end with tape, obscuring visible evidence of artificial flaws. Interpretation by the sonic test operator thus could not be influenced by visible flaws.

Smallest flaw consistently detectable in the threaded section adjacent to the test face is 0.050-in. deep, except for a small section near the probe face. In that 3-in. area, accuracy of flaw detection varies directly as the distance of the defect from the test face. This is due mainly to the chamfer on the bolt end. The chamfer prevents the sonic crystal from lying flat and simultaneously at right angles to the bolt length.

Sonic waves travel out from the crystal probe in a slightly diffused pattern. Theoretically, if the sonic pulsations travel in a straight line, it would be impossible to inspect that entire volume of the bolt lying directly beneath the chamfer. In practice, the fanning tendency of the sonic vibrations solves much of the problem. Save for a section ending approximately 3-in. from the test face, the bolt may be fully inspected.

Thus if the defect is less than 3-in. from the crystal face, it must extend further than 0.050 in. toward the bolt center for detection. When located approximately 1½ in. below the bolt surface, the flaw must be sufficiently deep to lie directly beneath the crystal. In other words, flaw length in the direction of the bolt's center must at least equal the diametric distance of the chamfer across the bolt.

These figures are based on a standard transmission fan angle of 4°, and on the particular chamfer of the bolts tested. A larger or smaller chamfer angle will change these values.

Smallest flaw detectable in sections of test bolts other than that just described is 0.050 in. By polishing bolt ends, defects as small as 0.040 in. may be picked up at 10 megacycles. This latter is not standard test procedure.

Rough-machined or dirty test surfaces interfere with transmission of ultrasonic waves. Metal peaks or dirt granules may break through the liquid couplant film, and produce false indications. Normally bolt ends are finished to a satisfactory smoothness. If any doubt exists, a comparison check is suggested.

"Ghosting" No problem

Use of a solid couplant often results in "ghost" indications, not present when the same area is checked with a fluid couplant. The condition is due to lack of complete and intimate contact between probe crystal and test surface.

On bolts tested, there is no diameter-to-length ratio lowering test reliability. In high temperature, high stress applications (such as these turbine bolts), investigation shows that any bolt designed within established safe load limits will not meet this situation.

Correlation of test results derived ultrasonically from both artificial and natural flaws is sufficiently close to validate the inspection technique. While standards developed here apply specifically to threads of steam turbine studs and bolts, the basic approach to the problem is readily adaptable to other conditions. Similarly, it is easily applied to inspection of a wide variety of parts. Particularly valuable is the information that test surfaces need only be nominally clean for accurate and verifiable results.

Interpretation of ultrasonic oscilloscope indications is the key to reliable inspection. This interpretation may be made by highly skilled sonic experts or by less experienced personnel. In the latter case, it is guided closely by a series of comparison curves carefully produced under laboratory conditions by known defects. This last approach now is being successfully used at Allis-Chalmers.



Mahon filtered Air Supply System and Mahon Finish Baking Oven installed on the roof of the plant.



Interior of Mahan Air Supply System showing one bank of Filters of the Air Filtering Equipment and the Direct Gas-Fired Air Preheating Unit.

To meet requirements in this particular installation, where floor space was a restricting factor, Mahon engineers built the space-consuming units of the finishing system on the roof of the plant. This is not unusual . . . today, Mahon can point to hundreds of installations in which major parts or entire finishing systems have been built and housed on the roof of plants where floor space inside the plant was at a premium. If you are contemplating new finishing equipment, you, too, will want to discuss methods, equipment requirements and possible arrangements with Mahon engineers. You will find them better qualified to advise you, and better qualified to do the all-important planning, engineering and coordinating of equipment which is the key to fine finishes at minimum cost. And, if you care to investigate, you will find that Mahon equipment will serve you better . . . because, Mahon equipment is engineered better and built better for more economical operation over a longer period of time. See Mahon's Insert in Sweet's Plant Engineering File, or write for Catalog A-656. Better still, why not have a Mahon engineer call at your convenience.

THE R. C. MAHON COMPANY . Detroit 34, Michigan SALES-ENGINEERING OFFICES in DETROIT, NEW YORK and CHICAGO

Engineers and Manufacturers of Complete Finishing Systems—including Metal Cleaning, Pickling and Rust
Proofing Equipment, Hydro-Filter Spray Booths, Dip and Flow Coaters, Filtered Air Supply Systems,
Drying and Baking Overs, Cooling Tunnels, Heat Treating and Quenching Equipment for
Aluminum and Magnesium, and other Units of Special Production Equipment.

MAHON

hen steel is 3 times stronger than iron . . .

as two and one-half times the rigidity...

Let costs a third as much per pound . . .

aren't more of your products designed for welded steel

Ask
THE
LINCOLN ELECTRIC
COMPANY
Cleveland 17, Ohio

Creating lower costs for industry ...with welded steel

New Technical Literature:

Catalogs and Bulletins

Aluminum data

An aluminum distributor, in celebration of the firm's 40th anniversary, has issued a new catalog, containing listings of warehouse stocks, charts, technical data and general information. There are also a number of colored wall charts being offered free. Strahs Aluminum Co., Inc.

For free copy circle No. 1 on postcard, p. 97

Plastic material

Uses of Formica's S-52 laminated plastic forming material are described in a new illustrated booklet. The light weight S-52 is described as being used for stretch forming, metal spinning and forming dies. The high pressure laminated plastic material is mentioned as easily machined, yet possessing toughness and resistance to friction and corrosion. It is formed with a paper base impregnated with phenolic resin. The booklet states that the material has been found suitable for aviation and automotive tooling. The Formica

For free copy circle No. 2 on postcard, p. 97

Roller bearings

Complete data on sizes, capacities, and mounting details for a company line of precision roller bearings is contained in Bulletin H-54A. Also described is a line of bandsaw guide wheels. Each bearing is illustrated with photographs and line drawings showing features of internal construction. Various seal combinations available are also illustrated and described. Dimensions, load capacities, and recommended uses for each of the bearings is listed in detail. A special feature is an interchangeability chart listing stock numbers of interchangeable bearings made by this firm and other manufacturers. McGill Mfg. Co.,

For free copy circle No. 3 on postcard, p. 97

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 97.

Gearmotors

Eight-page, two-color bulletin, "Reduce Speed" (E-2408), just published, describes a new line of gearmotors-detailed as the first line of gearmotors available incorporating new NEMA motors and completely redesigned gearheads. One bulletin section presents examples of the selection of types, mountings, enclosures, and ratios available. Another section illustrates maintenance with an exploded view of a typical gear assembly. Included in the selection section listing are types of gearmotors, types of service, output speeds, horsepowers, electrical characteristics, enclosures, and types of mountings. Reliance Electric & Eng. Co.

For free copy circle No. 4 on postcard, p. 97

Waste treatment

An 8-page bulletin outlines one firm's equipment for use in industrial waste treatment. This handbook mentions three purposes in treating industrial wastes: recovery of valuable materials; clarification of process liquids for re-use; and elimination of pollution. The firm's equipment is described as available for any industrial plant where treatment of process liquids is necessary; such as foundries, oil refineries and steel mills. Equipment is mentioned as available for coarse screening, grit removal, settling, skimming, and flocculation. Chain Belt Co.

For free copy circle No. 5 on postcard, p. 97

Analyzer

Bulletin FS-258 describes an instrument called the Spectranal, for the qualitative and semi-quantitative analysis of 61 elements. The sample required is described as exceedingly small (39 elements can be detected in concentrations of 0.05 mg or less per ml; 12 can be detected at 0.005 mg per ml). The instrument is also recommended for use in colleges and universities, to demonstrate emission spectroscopy. Fisher Scientific Co.

For free copy circle No. 6 on postcard, p. 97

Seam welder

Bulletin 316-7 completely describes a type MP 1 air operated, press type phase seam welder designed to cover a wide range of commercial welding applications. The brochure fully describes the machine and is supplemented with illustrations together with dimensional drawings. Machine data is tabulated to indicate KVA range, throat depths and welding capacities. One page of this 2-color, 6-page bulletin describes and illustrates "Mash Welding," a resistance seam welding technique to fasten edges of smooth weld with near thickness of one sheet. Sciaky Bros., Inc. For free copy circle No. 7 on postcard, p. 97

Hand tool line

Nine new hand tools for the sheet metalworker are introduced in Bulletin 78. They are: three new compound leverage shears (for straight, right and left cuts); three new straight snips; and three new combination snips. Also described and illustrated are bench shears, hammers, mallets, stakes, bench plates, rivet sets, groovers, hollow punches, bending machine, roofing folder, pipe crimper, roofing double seamer and gutter beader. Niagara Machine & Tool Works.

For free copy circle No. 8 on postcard, p. 97

Tool sharpener

The Method X tool sharpener for sharpening and modifying cutting tools is described in a 4-page bulletin. Covered are mechanics of removing metal particles from the unit; plus construction features and specifications. Firth Sterling, Inc.

For free copy circle No. 9 on postcard, p. 97





FREE TECHNICAL LITERATURE

Mining tools and bits

Illustrating mining tools and bits for cutting and drilling, a new catalog is now available. The 2-color booklet, M-8, contains information on new relief panel design cutter bits; rotary drill, core and drag, roof, open pit and rock bits; pining rods; augers; drive sockets; adapters; grinders, and grinding wheels. A method of silver brazing cemented carbide inserts into milled slots on upset drill steel is reviewed. Kennametal, Inc.

For free copy circle No. 10 on postcard, p. 97

Transformer

A bulletin on a new 15,000-v outdoor current transformer—described as the first to be molded of Hy-bute/60 insulation—has been announced. The 2-color, 8-page publication highlights the reported advantages derived from the use of this insulation. Information on application, construction, accuracy, mechanical and thermal ratings, and ratio and phase-angle test data is also incorporated. General Electric Co.

For free copy circle No. 11 on postcard, p. 97

Steam cleaners

An illustrated folder is available giving complete details on a new line of steam cleaners. The units are described as available in eleven different portable or stationary models with a choice of electric motor or gasoline engine drive. Construction and operating features are detailed, while photographs are included of models offered. Homestead Valve Mfg. Co.

For free copy circle No. 12 on postcard, p. 97

Portable balancer

Literature that describes the operation and application of a new troubleshooting tool and portable balancer is now available. The equipment is mentioned as used to remove guesswork in the maintenance, inspection and production problems of locating and correcting the cause of mechanical troubles in machine tools and in types of rotating machinery. The instrument described in the bulletin is called the IRD Model 1064 Variable Filter. International Research & Development Corp.

For free copy circle No. 13 on postcard, p. 97



TOUGH

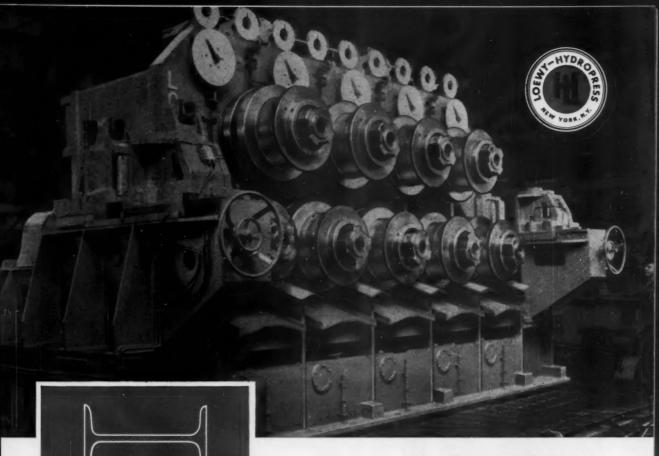


NOW - IN EASY TO HANDLE 50 POUND DOUBLE BURLAP BAGS Is your present abrasive tough enough to prove itself in performance? You can't judge an abrasive by looks, claims or promises. The only test of any abrasive is its cost per ton of castings cleaned. Because of exclusive metallurgical characteristics, Malleabrasive gives you the lowest cost per ton cleaned of any premium abrasive on the market! This has been proved in hundreds of production tests by users throughout the country. Prove it in your own production test-put muscle behind your blast cleaning with Malleabrasive! We GUARANTEE that Malleabrasive will give you lowest cost per ton of castings cleaned.

To order Malleabrasive, or for additional information on running a test, contact Globe Steel Abrasive Co., Mansfield, Ohio.

Sold and recommended by Pangborn Corporation, Hagerstown, Md.

MALLEABRASIVE



new LOEWY roller straightener produces more tonnage to closer tolerances

Structural sections, sheet pilings, wide flange beams and heavy rails can be straightened to tolerances well above commercial standards with the new 1956 Loewy roller straightener. This efficient machine operates at speeds up to 500 FPM, and its production capacity is high, i.e. 20 lb. beams can be straightened at the rate of 1,320 tons per 8 hour shift and 73 lb. beams at the rate of 2,200 tons per 8 hours.

Other advantages you get with this new Loewy straightener are:

- · All welded rigid construction.
- Anti-friction bearings throughout.

- Motor driven, power operated vertical rollers supported on both sides in roller bearings.
- Remote control of vertical and horizontal roll adjustment, with accurate selsyn indicators mounted conveniently on pulpit.
- Quick roll changing.

Loewy roller straighteners are in use in modern steel mills in the United States and abroad. The new model 1956 offers so many advantages over earlier designs that it is truly "the design of tomorrow . . . today." For more information about this precision equipment, write to us at 350-B Fifth Avenue, New York 1, N.Y.



LOEWY- HYDROPRESS BALDWIN-LIMA-HAMILTON

DIVISIONS: Austin-Western • Eddystone • Electronics & Instrumentation • Hamilton • Lima • Loewy-Hydropress • Madsen • Pelton • Standard Steel Works



ow cost oxygen can solve your increased steel tonnage production problems.

The contrast between the extremely high capital investment needed for expansion of steel producing facilities and the remarkably low cost of oxygen available from Air Products generators has been the determining factor in the decision by many steel manufacturers to use oxygen in blast furnaces, open hearths, and steel converters for increased tonnage.

Air Products will install, on a lease basis without capital investment by you, an oxygen generating station specifically designed for your particular requirements.

We design and manufacture:

Large Capacity Tonnage Generators for unlimited quantities of oxygen and nitrogen regardless of size, purity or cycle

ani

"Packaged" High-Purity Generators, producing high purity oxygen and nitrogen separately or simultaneously.

Let us help you investigate the possibilities of increasing your tonnage and save money with oxygen.

Air Products Dept. 1, Box 538, Allentown, Pa.

FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 92

Transformer

The Vernistat-a precision variable-ratio transformer - is introduced and described is a new folder. The unit is summarized as combining the desired features of several types of transducers. Construction features, use in computer circuitry and specifications are included in the folder. The Perkin-Elmer Corp. For free copy circle No. 14 on postcard

Resistance welding

Discussion of the role of resistance welding in the aircraft industry including illustrated installation stories of seam and spot welding is included in a new, 4-page bulletin. Federal Machine and Welder Co.

For free copy circle No. 15 on postcard

Metal identifiers

Metal-Cals - made of anodized 0.003-in. aluminum foil-are identifying tags described in a 4-page bulletin. According to the literature, the units are placed on a moist pad. protection for the adhesive backing removed, and the identifying plate is pressed firmly against a smooth, clean surface with a hard-faced roller. The metallized unit forms a bond on the surface to which it is affixed. C & H Supply Co.

For free copy circle No. 16 on postcard

Machinery

English manufacturer has prepared a 260-page general catalog describing the concern's line of machine tools; sheetmetal working machinery; woodworking machinery; engineers' small tools and workshop accessories; engines, compressors and pumps, foundry and forge plant equipment: electrical motors, generators and transformers; locomotives and cranes; construction and building equipment; and boilers and tanks. Thos. W. Ward, Ltd.

For free copy circle No. 17 on postcard

Conveyor belts

Company's line of stitched canvas belts are described in a new illustrated catalog. In addition, important facts on the selection and specification of stitched canvas belts are given as well as details of belt construction, impregnation and curing. Recommendations for all types of conveying-including general purpose, package, hot materials, abrasive materials and others-are included in special sections describing each differing belt in the line. Engineering data and specifications for various treated and untreated duck weights and strengths is also presented. Main Belting Co.

For free copy circle No. 18 on postcard

Small part miller

Bulletin No. Cl-1 describes a milling machine of 5 hp capacity having an infinitely variable table feed rate. Its standard hydraulic table feed circuit is mentioned as arranged so that hydraulic clamping can be added without changing the circuit. Standard speed range is from 50 to 1500 rpm with optional range from 80 to 2400 rpm or 700 to 4300 rpm. Machine is available in either simplex, duplex, or vertical type. Sundstrand Machine Tool

For free copy circle No. 19 on postcard

Hydraulic, air components

New catalog. Number 555, just issued, is entitled, "Hydraulic and Air Components by Star Jack." It describes the services and products of this company. Features. specifications, and applications of their pumps, cylinders, jacks, braces and other units are presented. Star Jack Co., Inc.

For free copy circle No. 20 on postcard

Postcard valid 8 weeks only. After that use 3/22/56 own letterhead fully describing item wanted.

Circle numbers for Free Technical Literature or Information on New Equipment:

51	52	53	54	55	56	57	58	59	60
41	42	43	44	45	46	47	48	49	50
31	32	33	34	35	36	37	38	39	40
21	22	23	24	25	26	27	28	29	30
11	12	13	14	15	16	17	18	19	20
1	2	3	4	5	6	7	8	9	10

If you want more details on products adver-

Page																			
Page	. Pro	di	uc	ŧ.	 				 	* *						. ,			
Page	. Pro	d	UC	ŧ.	 **		6)		 										
Your Name																			
litie							* *				 *			* 1		* *			
						 					 ,			•				* 1	
Сотрану																			
												*	. 6	8					 * -
Co. Addres	6																		
			, •				 *				 *					×			
City															,	Z	Di	ne	

FIRST CLASS PERMIT No. 36 Sec. 34.9 P.L.&R.) New York, N. Y.

D States, C A Dulling Office Box 77 0 > # 20 _1 s 0 mailed ш Ü 2 ш × Post (100 ST S Hecessary S ш SIN

postage

-

m º

ż

Village Station NEW YORK 14,

Sheet grippers

A line of grippers designed for faster sheet metal fastening by hand are described in a 4-page folder. Method of application is illustrated and discussion is included on the advantages the units offer in eliminating hole distortion, elongation and marring of metal surfaces. Aviation Developments, Inc.

For free copy circle No. 21 on postcard

Air wash systems

Acid-proof air washers are described in a 4-page folder. The units are reported as designed for chemical processing, for handling nitric acid and oxides of nitrogen, by-product recovery, process gas cooling, drying and washing, absorption, and high temperature or high acid concentrations. Operating advantages, materials, construction, specifications and available accessories are detailed. Automotive Rubber Co., Inc.

For free copy circle No. 22 on postcard

Tabletting equipment

A complete line of equipment for granulating, mixing and drying industrial materials is described in a new 8-page bulletin. The equipment, developed as auxiliaries for the firm's tablet machines, is discussed in detail, and complete specifications are given. Included in the new bulletin are descriptions of oscillating granulators, a pulverizer, mixers, and drying cabinets. F. J. Stokes Machine Co.

Metalworking equipment

In a new 12-page booklet entitled "4 in 1," one firm gives a picture of the four basic lines of metalworking machinery it builds. Using a picture-and-caption treatment, the two-color catalog shows various types of mass-production equipment. The cold heading equipment section shows a variety of headers, threaders, slotters, and related bolt and nut machinery. The power press section includes eyelet machines and multiple plunger presses, as well as blanking, transfer, horizontal and other press equipment. Waterbury Farrel Foundry & Machine Co.

For free copy circle No. 24 on postcard

Plastic pipe

A new bulletin, mailed on request, gives information on a line of PVC (polyvinyl chloride) rigid type unplasticized pipe. This pipe is said to defy attack by industrial chemicals such as salt solutions, acids, alkalis, sulfates, caustic solutions, bleaches, and many others. It is described as extruded in standard pipe sizes from 1/2 in, through 8 in, in Schedule 40 and 80 weights, with larger sizes fabricated from curved sheets. Technical bulletin 80-3 gives engineering data on the PVC pipe and lists over 200 chemicals it will convey without being attacked. Joseph T. Ryerson & Son, Inc.

For free copy circle No. 25 on postcard

Motor design data

A reference library of over 900 special designed motors of many sizes and shapes is now available. While originally designed for special powering jobs, the motors listed are described as suited, or adaptable, to other applications with similar drive needs. The purpose of the library is reportedly to save motor purchasers expense and delay. Also, individual sample units are described as quickly available for pre-production test running of equipment. Write for free literature and library details to Reuland Electric Co., Alhambra, California.

Compressors

Types of air and gas compressors used in the process and chemical industries are shown in a new, 3color bulletin. The booklet, entitled "Compressors for the Process Industries," shows a range of centrifugal and reciprocating units, with electric, steam, gas and diesel power, for all pressures from deep vacuum up to 35,000 psi and capacities up to 165,000 cfpm. These compressors handle chlorine gas. hydrogen, ammonia, hydrogen chloride, and a host of other gases as well as air. The booklet also illustrates fifteen basic types of compressors built by the manufacturer from which most of the combinations used in these industries have been specifically designed. Ingersoll-Rand Co.

For free copy circle No. 25 on postcard

NISN m S Village Station NEW YORK 14, N. Y. Post Office Box S I TA m N malled m 7 * 5 -70 111 the 0 77 Z United 0 D States N 9 m

FRST CLASS
PERMIT No. 36
(Sec. 34,9 P.L.AR.)
New York, N. Y.

Postcard valid 8 weeks only. After that use 3/22/56 own letterhead fully describing item wanted.

Circle numbers for Free Technical Literature or Information on New Equipment:

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
Pag	0	Pro	duct.	*****					
Pag	0	Pro	duct.	*****		*****		*****	****
Pag Pag You	r Nam	Pro	duct	*****	*****	*****			
Pag Pag You Title	r Nam	Pro	duct.		*****	*****			
Pag Pag Your Title	r Nam	Pro	duct.		*****				

UNITED

Designers and Builders of Ferrous and Honferrous Rolling Mills, Mill Rolls, Auxiliary Mill and Processing Equipment, Presses, and other Heavy Machinery. Manufacturers of Iran, Nodelar Iran and Steel Castings, and Weldments.



UNITED ENGINEERING AND FOUNDRY COMPANY

PITTSBURGH, PENNSYLVANIA

Plants at: PITTSBURGH • VANDERGRIFT • YOUNGSTOWN • CANTON WILMINGTON (LOBDELL UNITED DIVISION)

Subsidiaries: ADAMSON UNITED COMPANY, AKRON, OHIO STEDMAN FOUNDRY AND MACHINE CO., INC., AURORA, INDIANA

UNITED can serve you no matter where in the world you are

Can a Steam Atmosphere Furnace Save You Money?

There's a good chance it can if you heat treat any of a wide variety of ferrous parts. Here's a check list to show you why.

	PRODUCT	MATERIAL	ADVANTAGE
	Cams, bearings, valve tappets, pistons, piston rings, etc.	Cast iron	Wear resistance improves
	Twist drills, taps, punches, reamers, counter bores, etc.	High-speed tool steel	Tool life increased
	Saw blades, machine parts	Steel	Improved bonding surface for paint or lacquer prevents chip- ping and cracking
3	Business machine, sewing machine, gun parts, bolts	Steel '4	Clean, safe, cheap method of blueing
	Bearings, bushings, pistons, toy parts, etc.	Powdered iron	Hardness and com- pressive strength im- proved

A. C. Gilbert Co. inexpensively achieve that uniform, wear resistant, blue-black finish on the undercarriages of scalemodel trains by heat treating in an L&N Steam Homo furnace.

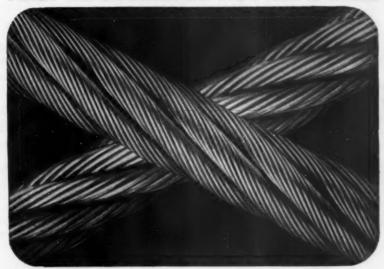


Complete equipment for steam atmosphere heat treating consists of a Steam Homo® furnace and L&N temperature control panel. Both furnace and instrument panel are shipped completely assembled ready for installation in your production line. Furnaces are available in a variety of

sizes to suit your particular application. For complete information just write us at 4956 Stenton Ave., Phila. 44, Pa., and ask for Catalog TD2-620.



FIRST WE DEVELOPED 1105 ROPE WIRE.



THEN WE MADE ROEBLING'S



1105 takes Royal Blue out of the ordinary wire rope class.

1105 is a rope wire that's new-that's stronger. It's the biggest news in many years.

1105 is the result of more than a century of research and development—it's the wire that gives Roebling Royal Blue the stamina that pays off in service.

Contact your Roebling distributor or write us for the full story.

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation



JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVDN AVE. . BOSTON, SI SLEEPER ST. . CHICABO, 5525 W. RODBEVELT RD. . CINCINNATI, 3353 FREDONIA AVE. . CLEVELAND, 13225 LAKEWOOD HEIGHTS SLVD. . DENYER, 4801 JACKBON ST. . DETROIT, 915 FISHER BLDG. . HOUSTON, 5216 NAVIGATION BLVD. . LOS ANGELES, 5340 E. HARBUR ST. . NEW YORK, 19 RECTOR ST. . DESBAL TEXAS, 1930 E. 3ND ST. . PILLADELPHIA, 230 VINE ST. . SAN FRANCISCO, 1740 17TH ST. . SEATTLE, 900 1ST AVE. S. . TULBA, 331 N. CHEYENNE ST. . EXPORT BALES OFFICE, 19 RECTOR ST., NEW YORK 6, N. Y.

WARD STEEL co.

PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in America of

SPRING STEEL

We believe that the way to sell is to carry a stock which permits satisfying any reasonable warehouse demand.

878 Rindge Ave. Ext. Phone UN 4-2460 CAMBRIDGE 40, MASS.

Branches: 3042-3058 W. 51st Street, CHICAGO, ILL. Phone: Grave Hill 6-2600

7 Fenner Street, Providence, R. 1.
Phone: Gaspee 1-5573, 1-8573

Like to speed up your reading?

Turn to pages 2 and 3 of The IRON AGE every week and let the

Digest of the Week in Metalworking

help you find your favorite features.

IT PAYS TO READ IRON AGE ADS TOO!

RESEARCH: Measure Carbon

By determining the amount of CO₂ generated in burning steel sample, U. S. Steel measures carbon content within 0.0005 pct.
... Method is used to test in ranges below 0.03 pct carbon.

A new device, utilizing the chemical fact that carbon and oxygen have a strong natural affinity for each other, is now being used at U. S. Steel's Research Center in Monroeville, Pa., to measure within 0.0005 pct the carbon content of low-carbon steels.

The apparatus was designed and developed by research personnel of U. S. Steel for closer control of carbon in steels where this element is a decisive factor in quality and performance. For example, in high silicon steels for transformers or dynamos, carbon must be kept to a minimum. In enameling steels, certain quantities of carbon are necessary but must be controlled to very close specifications for best results.

The new equipment is described as used only in the analysis of steels where accuracy greater than that provided by standard equipment is required, usually in the range below 0.03 pct carbon. The device consists principally of a force-pump together with a mercury diffusion pump to create a vacuum in the system, an oxygen purifier, a combustion chamber, freezing chambers and a measuring system.

Absolutely pure oxygen is essential to accurate analysis. The gas is cleaned in a system consisting of two liquid-nitrogen traps, separated by a catalyst of a s b e s t o s on which palladium chloride has been dissolved and then baked. Oxygen from a tank is admitted into the catalyst chamber which is heated to about 400°C. Here, any hydrocarbons contained in the oxygen are converted to carbon dioxide and water.

The oxygen is recirculated

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 97. Just indicate the page on which it appears. Be sure to note exactly the information wanted.



Carbon dioxide is measured by burning steel sample in oxygen.

about three times by moving the liquid-nitrogen traps from one side of the catalyst to the other. At —195°C the liquid nitrogen freezes the oxygen. This creates a vacuum in front of the remaining gaseous oxygen and thus acts as a pump.

Procedure Outlined

The steel samples to be analyzed consist of small chips and shavings. These are carefully weighed and then placed in a glass rack containing a number of pockets to hold several different types of samples. The rack is sealed into the vacuum system and mounted directly over the combustion chamber. Samples are drawn into the combustion chamber by a magnet applied by the operator to outside of glass.

The combustion chamber is a platinum crucible lined with aluminum oxide. It is induction heated to about 1700°C. At this temperature the steel sample is burned in the presence of a controlled amount of purified oxygen. The gas CO₂ is generated along with other gases.

These mixed gases then pass through another freezing trap containing dry ice and acetone to maintain a temperature of -80°C. At this temperature, the CO2 passes through as a gas, the interfering gases remain frozen in the trap. The CO: is then frozen out in liquid nitrogen and released into a pressure gage. Since the carbon dioxide formation depends entirely on the amount of carbon in the steel sample, the gas pressure can then be translated directly into amount of carbon originally contained in the steel being tested.

Testing:

Gamma-ray projector checks welds of pressure vessels

Radiographing large pressure vessels—to detect possible flaws in vital welds—is one of the first assignments of a gamma-ray projector recently introduced by The M. W. Kellogg Company, New York, N. Y.

In that application it is positioned



Shielding permits close use of gamma-ray projector.

on a fork-truck inside the pressure vessel, while the film to be exposed subsequently by the radio-active

LOWER YOUR COSTS IN PLATING

by Guy A. Cummings
Metal Finishing Sales Manager
FREDERIC B. STEVENS, INC.



How Modern Equipment Can Improve Your Operations

Judging from the vast number of quotations on automatic equipment for electroplating, anodizing and processing being made each month at Stevens, we know the interest in automatic equipment has never been higher. To meet competitive prices, improve finishes and lower labor costs, metal finishers are constantly challenged to make modern improvements in their operations. Usually this means more modern equipment.

Let us tell you how the Stevens Automatic Barrel Plating Machines can help you. They are used for zinc, cadmium, nickel, brass plating of such small parts as screws, bolts, nuts and stampings, and also a wide variety of bulk immersion processes such as phosphatizing, washing, pickling, and chromating.

We have been making these machines for a long long time—hundreds are in operation—so you can be confident that there are no mechanical bugs. They are simple to operate—feature automatic unloading—and when equipped with automatic load devices, several machines can be operated by only one man. The cylinders which take the parts to be plated are the oblique open ended type—without



covers. By raising or lowering the cylinder the parts slide in and out without the necessity of unclamping and removing covers normally needed for horizontal type cylinders.

The Stevens simple compact design makes it economically feasible to purchase production capacities as high as 4000 pounds per hour in one machine, or just as practical to distribute the capacity between two or more machines to provide flexibility in plating thickness, production, etc.

Here are other advantages in using Stevens Automatic Barrel Machines—uniformity of deposit, fewer rejects, better working conditions, easier chemical control, better scheduling and delivery and lower costs per piece.

The selection of the right equipment, the capital investment required, the arrangement of your plant to install the equipment are important considerations. Frederic B. Stevens, Inc., with its long experience in the metal finishing field has made many analyses of this kind. We can help you too.

Write to Frederic B. Stevens, Inc., 1808 18th Street, Detroit 16, Michigan.



METAL FINISHING EQUIPMENT AND SUPPLIES FROM CASTINGS OR STAMPINGS TO FINISHED PRODUCT

BRANCHES:

Buffale • Cleveland • Indianapolis • New Haven



source is attached to the vessel's exterior. With the shutter closed the shielding is so thorough that men can work close to the unit in complete safety—even photographic materials can be brought near it without fogging.

In addition to being safe to operate, this gamma ray device is said to offer a high degree of penetration; be lower in cost; portable; need no electricity or control board for operation; and be capable of use for the simultaneous exposure of areas over a 360° arc.

Among the industries that will have use for this new projector, Kellogg states, are manufacturers of large vessels, heat exchangers and condensers; builders of oil refineries and chemical plants; pipe fabricators; manufacturers of diesel, steam and turbine engines; foundries; and the marine, ordnance and aircraft industries.

The sales agent for the projector is Metal & Thermit Corp., New York.

Materials:

Coagulant aids water clarification for tin plate processing

A new type of coagulant aid, a mixture of polyelectrolyte and bentonite clay, is being used in an automatic water clarification and demineralization system at Jones & Laughlin Steel Corp.'s tin plate department, Aliquippa, Pa. The new aid, made by Hagan Corp., Pittsburgh, is reported as saving J&L an estimated 30 pct in the amount of alum coagulant used, and simplifying control of the clarifiers and control of the sludge blanket in the clarifiers.

Other advantages cited by J&L are: the coagulant aid causes the sludge blanket to be more stable and less sensitive to upflow rates. In addition, it helps to produce an improved tough and rapid settling floc and reduces the dosages of other chemicals to a minimum.

The reduction in alum dosage in turn is described as reducing the amount of alkali addition necessary for pH adjustment. There also has been a reduction in regeneration chemical cost and decreased number of regeneration cycles in the deionizing operation which follows clarification.

Jar Testing Eliminated

Time consuming jar testing, previously necessary to guide chemical dosages, has been entirely eliminated. The company also saves in chemical handling and storage space. The new material is mentioned as requiring only 15 pct as much storage floor space, as did the materials formerly used.

The water conditioning system processes 4 million gallons of clarified water and 1 million gallons of demineralized water per day. Suspended solids are removed by continuous coagulation and settling in two clarifiers.



Coagulant aid is poured in powder form into mixing tank.

Clarification Described

The flocculating chemicals are introduced ahead of the reactors, in varying quantities depending upon flow of water to the reactors. In the clarification process, river water is pumped at the rate of 3000 gpm through three strainers to a mixing stand where the flow is divided between the two reactors. Rates of flow to the reactors are measured, recorded and integrated and the flocculating chemicals-alum, caustic soda and the coagulant aid-are fed into the system. Rate of feed of the chemicals is controlled by an electrical contact counter.

TECHNICAL BRIEFS

The free-flowing coagulant aid is added in powdered form in a mixing tank and fed just ahead of the clarifiers. The amount of aid is carefully proportioned into the water. Dosage ranges from 5 to 15 ppm.

The slurry is mixed quickly and thoroughly with the raw water to be treated, helping to speed up the flocculating action of the alum. The aid causes the floc which enmeshes the finely divided sediment, to form more quickly, to be tougher, and to settle more rapidly.

Some Demineralized

A large portion of the clarified water, approximately 2300 gpm is pumped directly from the clarifier outlet to point of usage. This water is not filtered; it has a turbidity less than 10 ppm and is used in the pre-plating operations and in sensitive heat exchanger applications. Another stream of water from the clarifiers, about 750 gpm, is pumped to pressure filters and then to the demineralizing plant. After demineralization this water paralleling steam condensate in purity, is used in the tin-plating and post-plating sprays where water purity is of vital importance.

Development of the system at J&L was the result of cooperation between Hall Laboratories, a subsidiary of Hagan Corp.; Cochrane Corp. of Philadelphia; and J&L engineers.

Heat Treating:

Vertical furnace handles parts over 10 ft long.

Installation of a vertical heat treating furnace capable of handling parts 10 ft, 8 in. long has recently been completed at Pittsburgh Commercial Heat Treating Co., Pittsburgh. Furnace chamber is 45 in. in diam and maximum temperature is 1850°F.

An adjacent tempering furnace of the same dimensions is also provided.

The design combines a station-



Ask how to

Standard conveyors



Typical pouring floor with molds on parallel lines of roller conveyors.

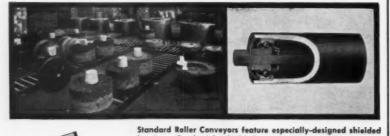
Use our specialized experience to good advantage in your foundry

STANDARD Conveyor Company has a record of 50 years of service to foundries and allied industries. This experience can be put to work to help you cut your costs . . . simplify material handling . . . free expen-

sive manpower.

Here's your opportunity to get a perfect combination of long, deendable service with maximum flexpendable service with maximum ibility. Quality-built Standard units are offered in a wide range of stock types and sizes that allow custom-engineering at standard unit prices.

Before you invest in new equip-ment, get the facts from Standard on powered as well as gravity conon powered as well as gravity conveyors in both permanent and portable models. STANDARD CONVEYOR COMPANY, General Offices: North St. Paul 9, Minnesota. Sales and Service in Principal Cities



longer, trouble-free roller life.

For details, see the Star ord Engineer listed in the phone beek or write for Bulletin 309. Address



bearings. On the job, shields keep out spillage and sand, give

Sales and Service in Principal Cities.

TECHNICAL BRIEFS

ary furnace beneath which quench tanks (oil or water) are moved and into which heated parts are lowered. To load the furnace, parts are placed on a movable car and pulled upwards in the retort.



Parts for heating are placed in car, pulled upward in retort.

Methods:

Infra-red heaters used to thaw coal cars

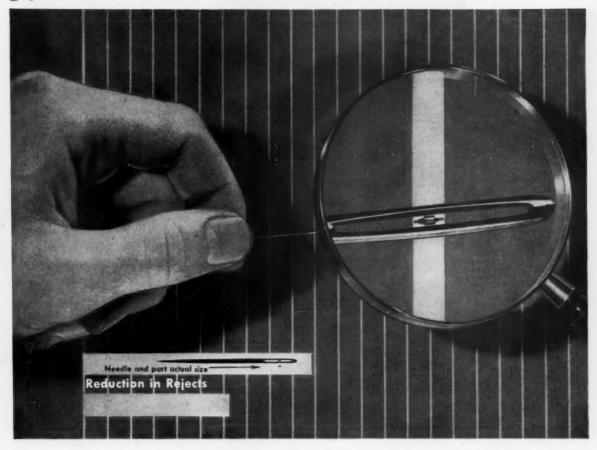
Railroad men may be relieved of a major headache in the thawing of coal or ore cars in winter time, because of a new process of heating by infra-red rays, according to a report from Perfection Industries, Cleveland.

The process, imported from Germany, is designed to thaw coal or ore frozen in rail cars so that it can be unloaded in cold weather.

Recently, Perfection, which makes the infra-red gas units, held a demonstration for officials of the Lakefront Dock Co., Toledo. It was attended by more than 100 officials from the major railroads, coal and steel companies, public utilities and other coal and ore users throughout the nation who are interested in the success of the plan.

The new process calls for running a coal tar between two banks of the infra-red units. Natural or artificial gas is piped to the units. The gas burns at the face of small ceramics and gives off infra-red heat.

While Perfection makes no



HOW FAR CAN YOU GO

in reducing rejects of critical parts?

Almost invisible to the naked eye, these tiny pinion pivots for small precision wrist watches easily fit into the eye of a small darning needle. And they are mass produced on automatic screw machines!

It's tough enough to work with such minute parts, but take a look at these really close tolerances: Over-all length is .0610" with a tolerance of ± .0008". End pins are .004" round with a tolerance of + .00002", — .00000". The first steel used couldn't meet these strict specifications. Rejects ran too high.

Someone decided there must be a better steel for this job. And that's when Carpenter entered the picture. A specially-engineered Carpenter Steel was put to work. Result: fabrication improved and rejects were reduced 30°Z.

Why not discover how far you can go in improving

your products and reducing costs? Carpenter has a wide range of quality steels for virtually any critical application, backed by one of the country's most alert service and warehousing organizations.

Begin now by sending for a copy of our 36-page booklet, "A Guide to Specialty Steels as Made by Carpenter." The Carpenter Steel Co., 121 W. Bern St., Reading, Pa.

Are you taking advantage of these speciallyengineered steels as made by Carpenter?

Matched Tool and Die Steels / Stainless Steels / Special Purpose Alloy Steels / Silicon and High Nickel Alloys / Valve, Heat-Resisting and Super Alloy Steels / Tubing and Pipe / Fine Wire Specialties

Carpenter |

for product improvement



TECHNICAL BRIEFS

spectacular claims for the success of the new method, if it works as they are convinced it will, they say it may cut in half the present time needed to thaw out frozen coal in cars and do it more economically.

Other Methods Tried

Railroad men have previously tried a variety of methods, including dynamiting the coal,



Banks of gas heaters on each side thaw coal for unloading.

shooting in steam-filled lances, passing the car through coal fires laid alongside the tracks, and having men with torches warm the sides of the cars.

The new process says Perfection should prove cheaper because it utilizes gas and because the units heat only the cars and not the surrounding air. (In this they act like the rays of the sun.) Also, it will avoid searing the sides of the car.

Testing:

Scientists check oxygen role in iron-enamel adherence

Scientists, the National Bureau of Standards states, believe that oxygen in the firing atmosphere plays a role in the adherence of vitreous coatings to a metal. (These vitreous enamels are used on metals to provide protection against corrosion at both normal and elevated temperatures and also to provide a decorative finish.)

To obtain detailed information about the adherence mechanism, the Bureau conducted a series of experiments in which the oxygen



SAVES ON EVERY LIFTING JOB



On the roughest, toughest heavy-duty cycle — or ordinary lifting jobs — the Series "700" 'Load Lifter' Electric Hoist gives you the best in load-handling performance and safety. It is a smooth-operating hoist, engineered to lift *fast* at the push of a button. In 2 seconds, a 1-ton load can be lifted a foot! It was the first hoist to have safe 24 volts at the pendant push-button.

Get new speed and cost-cutting power into your load handling with the Series "700" 'Load Lifter' Electric Hoist. Rarely needs maintenance, even under the most adverse operating conditions. Can be serviced in the air. Capacities up to 15 tons. Single and two-speed models. All types of suspension. Check with your "Shaw-Box" Distributor for details or write us for Bulletin 410.





HOISTS

MANNING, MAXWELL & MOORE, INC.
MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties, Makers of 'ASHCROFT' Gauses, 'MANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AM RETIC AN' and 'AMERICAAM' AMERICAEM' Industrial Instruments, and Aircraft Products.



Remember

ALL CONDITIONS CAN BE MET WITH ONE TYPE...THE EC&M TAB WELD PLATE RESISTOR

What resistor section will give the most advantages ... the easiest to select ... to install ... to save manpower maintenance!

EC&M TAB-WELD Resistors simplify these problems . . . One style combines all the advantages of previous resistor-designs . . . easy tap-changing . . . non-breakable . . . corrosion resistant . . . and wide range of ampere capacities. And there is NO BURN-ING at grid-eyes or at tap-plates . . . TAB-WELD construction maintains a constant current-carrying path independent of end clamping-nut pressure.

Look into EC&M Bulletin 942 TAB-WELD Resistors for economy in selection and performance. This one source meets all conditions efficiently.

4498 Lee Road

- HIGH CAPACITY
- . NO BURNING AT GRID-EYES
- NO PERIODIC NUT-TIGHTENING
- STOCK SIZES
- MANY TAPS FOR EASY ADJUSTMENT
- CORROSION-RESISTANT



Standardization on TAB-WELDS provides many advantages for this mill.

On mill controllers, cranes and charging machines in this plant, EC&M TAB-WELD Resistors have operated trouble-free for several years. Standardization on these resistors has saved manpower . . . and cut maintenance costs.



HE ELECTRIC CONTROLLER & MFG. CO.

Division of Square D Company

Cleveland 28, Ohio

JOT NAME, TITLE AND ADDRESS IN THIS SPACE



content of the furnace atmosphere was varied when the same enamel containing varying amounts of an adherence promoter, cobalt oxide, was fired onto iron.

Results reveal that, for optimum adherence, any decrease of oxygen in the furnace atmosphere requires a corresponding increase in the amount of cobalt oxide in the enamel. Enamels containing 3.2 weight pct or more of cobalt oxide develop a weak but definite bond in furnace oxygen concentrations as low as 0.02 mole pct, but when smaller amounts of cobalt oxide are present, a greater oxygen content of the furnace atmosphere is necessary for appreciable bond development.

The study, which was carried out for the National Advisory Committee for Aeronautics, is one of a series of investigations at NBS aimed at obtaining a better understanding of the ceramic to metal bonding mechanism.

Equipment Included Furnace

The equipment used at the Bureau to study the effect of oxygen consisted essentially of an airtight inductively heated furnace into which metered quantities of oxygen and nitrogen could be admitted at known pressures. The specimens were fired inside the muffle at 1550°F for a predetermined period. The specimen blanks were of ingot iron, 4 by 4 by 0.047 in., pickled and then coated with the enamel composition. The enamels contained varying quantities of cobalt oxide or cobalt oxide with manganese oxide, and were prepared according to standard procedures. Adherence of the fired enamel to the specimen was evaluated with the Porcelain Enamel Institute adherence meter. When used according to the ASTM test procedure, this instrument establishes the fraction of the test area to which the coating continues to adhere after the specimen has been deformed in the prescribed manner.

A coating containing 0.4 pct cobalt oxide developed its best ad-



Remarkably quick, easy assembly and welding of the five .209" gage formed parts that comprise a modern compressor housing is possible because each part is precision formed to extremely exact-

ing dimensions. Additional machining is not necessary. Each part is finished, ready for final assembly, as it comes off By-Products' new high speed press line.

Now-fast stamping to close tolerances!

WHAT CAN OUR NEW PRESS LINE DO FOR YOU?

■ By-Products Steel Co.'s modern new high speed press line adds light gage pressing equipment to its already extensive heavy plate shaping facilities. The line will satisfy manufacturers who need precision formed parts from 16-gage material well into heavier plate thicknesses. And dependability is assured by the combination of the very latest equipment and skilled craftsmanship.

We've made the investment in equipment and manpower. You pick up the benefits in lower overhead...fewer production steps in your shop... reduced freight costs...virtually no scrap loss...lower production costs.

Get the facts! Write, outlining your interests, to Manager, Marketing Service, 831 Lukens Building, Coatesville, Pennsylvania.

PRESS LINE UNITS

- 1. 900 Ton Hydraulic Press
- 2. 600 Ton Mechanical Press
- 3. 150 Ton Punching Press
- 4. 45 Ton Punching Press
- 5. 22 Ton Punching Press
- 6. Trimming Press
- 7. Annealing Furnace
- 8. Washing Machine
- 9. Automatic Loader and Greaser

Units are linked by reversible conveyors for fast, economical production.

BY-PRODUCTS STEEL CO.



A DIVISION OF LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

TECHNICAL BRIEFS

herence at an oxygen content of 20 mole pct-approximately that of air-while enamels with higher cobalt oxide contents reached their peak adherences at about 5 mole pct of oxygen. It was observed that enamels with larger amounts of adherence oxides do not require as much oxygen in the furnace atmosphere as those with smaller amounts; this observation indicates, the Bureau states, that oxygen can be supplied from the enamel itself. The conclusion is that the cobalt oxide is in some way supplying or facilitating the supply of some of the oxygen, since the amount of cobalt oxide is the only difference between the coatings.

Handling:

Auto firms use new press for sheet-scrap baling

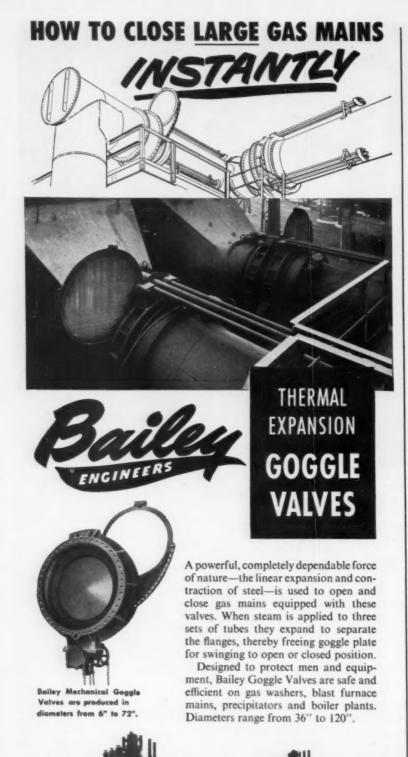
To meet demands of modern automobile and body plants, Logemann Brothers Co., manufacturers of scrap presses in Milwaukee, have installed, in a number of plants, a new type of scrap-press unit for baling large tonnages of steel sheet scrap.

The equipment, they report, can also be adapted to other types of plants and other sheet metals with some modifications in press dimensions, pumping equipment, valving and accessory items to suit the conditions and requirements of

The scrap press is a triple-compression unit having a box 10 ft long x 5 ft wide x 4 ft deep. Logemann states the first compression lengthwise through the box reduces the scrap charge from 120 in. to 20 in. at the forward end; second compression downward reduces the 48 in. dimension to 20 in., and third compression from one side reduces the 60 in. width dimension to a variable, depending on the quantity and character of scrap charged, usually 20 in. to 30 in.

The cover and all rams are retracted simultaneously with the

PITTSBURGH 16, PA



1221 BANKSVILLE ROAD

Cut your costs with AIR COMPRESSORS AIR HOISTS AIR CYLINDERS



A plentiful supply

of air to speed production throughout your plant is assured with powerful, precision-built *Curtis* Air Compressors.

- air-cooled, two stage—1/4 to 20 H.P. inclusive
- water-cooled, single stage—20 to 50 H.P. inclusive
- Timken tapered main bearings permit easy external adjustment
- long-life pressure-lubricated connecting rod and piston pin bearings

Tank-mounted compressors in sizes from ¼ through 15 H.P. inclusive (1 to 78 cu. ft.)—also available in base-mounted type.

Simple and base-mounted compressors from ¼ through 50 H.P. inclusive (1 to 300 cu. ft.).



LIFT, LOWER, PUSH or PULL

easily, economically and safely with Curtis Air Hoists and Cylinders... capacities up to 10 tons.

- lower initial cost
- lower maintenance costs
- smooth operation and precision control
- self-closing, rotary disc self-grinding valves

PENDANT AIR HOISTS... ideal for any lifting or lowering operation.



BRACKETED AIR CYLINDERS . . . can be mounted horizontally or vertically for lifting, lowering, pushing or pulling.

FOR COMPLETE INFORMATION ON THIS CURTIS COST-SAVING EQUIPMENT... WRITE TODAY!

CURTIS MANUFACTURING COMPANY

PNEUMATIC DIVISION

1948 KIENLEN AVENUE . ST. LOUIS 20, MISSOURI

CM-837

OTHER CURTIS PRODUCTS: Automotive Lifts and High Pressure Car Washers; Commercial and Home Air Conditioning



opening of a section in the forward end of the bottom of the press, which permits the finished bale to drop out and then closes immediately. The bale discharge opening across the bottom is full box width in one dimension and 28 in. in the other, so that oversize bales discharge speedily without interference. The two horizontal rams are retracted by compressed air, the overhead ram by hydraulic power, and cover is hydraulically operated.

Compressed Air Used

The main valves, which direct the fluid delivery of the pumps to the respective press cylinders in sequence, are operated by compressed air through compact, close-coupled air pistons, and flow of air to these air cylinders is controlled by a series of electrical relays, travel-limit switches and timers. Operation is automatic.



Triple-compression is featured on this baler.

A pre-loading hopper straddles the press box, and this hopper usually receives scrap from a scrap conveyor. The hopper can be linked to a scale and set to trip when the hopper charge reaches a predetermined weight. When the automatic opening of the hopper-bottom permits the scrap to slide into the press box, the feed conveyor usually stops automatically then instantly resumes feeding through its motions.

Timing can be so accurate that the hopper is again filled by the time the previous bale has dropped through, the bottom of the baler box has closed, and the cover is back. Operation repeats—in some automotive plants on the basis of 24 hours per day.

TECHNICAL BRIEFS

Metals:

Controlled anodizing is used to get gold-colored aluminum

A new method of producing non-fading gold-colored aluminum in a variety of shades and tones is reported by the Kaiser Aluminum & Chemical Corp., Oakland, Calif.

Source of the color is described as built into the metal itself. The color is brought out—without the use of dyes or other coloring materials—by anodizing under readily controlled conditions. The gold color may be varied from pale straw to deeper gold and gold-bronze tones, and the finish may be either bright or satin.

The patented process is said to impart a sunfast gold color and provide excellent color matching.

Applications Cited

Because of the permanence of its color, the manufacturer states, this new gold aluminum is especially suited for a wide range of exterior architectural applications, automotive trim, furniture and home appliances.

Development is also underway of an alloy particularly suitable for decorative ware and other applications where an exceptionally bright, rich gold finish is desired.

The gold aluminum has been produced experimentally at the corporation's Trentwood, Washington, rolling mill, and will soon be commercially available in sheet form. Development work is now in progress aimed at adapting the gold alloy to products in other forms, such as extrusions.

Anodizing Colorizes

Production of the new Kaiser gold aluminum begins with the addition of certain readily alloyed constitutents to molten aluminum. The color of the resulting alloy is that of normal aluminum and remains so until it is anodized, at which time the surface takes on the gold color.

In sheet form the new alloy for most applications will be applied





"BEST \$1306 WE EVER SPENT!"

That's the price of this 5-Ton HANNIFIN Press*

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

WRITE. Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



HANNIFIN

Hannifin Corporation, 513 S. Wolf Road, Des Plaines, Illinois

Hendrick Adds <u>Class</u> to Living Rooms and → Locker Rooms →

More and more designers are including Hendrick Perforated Metal in the fabrication of new products. Typical of these is one company who manufactures the attractive room divider shown

above using Hendrick Perforated Metal Square Link design. Another manufacturer installs an attractive Hendrick Ornamental Metal Grille on linen closet and locker doors.

And there are thousands of other applications where Hendrick Perforated Metal has added to product style and functionalism. For information on the type of perforated metal or grille best suited to your needs, call Hendrick today.

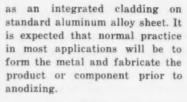


Hendrick

MANUFACTURING COMPANY

37 DUNDAFF ST., CARBONDALE, PA.
Sales Offices in Principal Cities

Perforated Metal • Perforated Metal Screens • Wedge-Slot and Hendrick Wedge-Wire Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armorgrids • Hendrick Hydro Dehazer



Ultra-violet Tested

Upon anodizing, an electrochemical process that creates a protective surface coating, the added alloying elements give the anodic coating a gold color. Different shades are produced by varying the anodizing conditions. Different surface finishes may be given the metal before anodizing to provide any desired degree of brightness or surface effect.

The product has been subjected to an ultra-violet exposure test simulating seven years of sun exposure under the worst ultra-violet conditions known to exist in the United States, Kaiser states, with favorable results.

The gold finish is described as increasing corrosion protection and resistance to wear, while withstanding boiling water temperature without color loss.

Joining:

Electric terminals connected by resistance welding.

The reported efficiency of resistance welding in joining electrical terminals to their respective wires on a production basis is currently being demonstrated by the Taylor-Winfield Corp., Warren, Ohio.



Welding, staking and cut-off are done automatically.

TECHNICAL BRIEFS

In their demonstration, the terminals are fed in strip form, then welded and staked to the terminals. The use of resistance welding is mentioned as insuring a good electrical bond. Heat time is reported short to permit use of plastic covered wire without damage to the cover. Mechanical staking is also done, clamping the wire covering firmly to the terminal and removing service strains from the weld. Feeding of terminals in strip form and addition of a cut-off shear results in faster production.

All three operations, welding, staking and cut-off, are done automatically as the welder indexes the product through the several stations.

Research:

Classifications of knowledge housed at Western Reserve

Classified outlines of subject matter in specialized fields of knowledge are currently being collected by the Special Libraries Association. Such classification schemes are of tremendous help, not only to librarians but to researchers, scientists, and others concerned with organizing the literature in their particular fields of interest.

The Special Libraries Association maintains a loan collection of such classifications on subjects ranging from accounting to wood. The collection includes both the natural and social sciences in broad categories such as chemistry, physics, and law, and also in narrower subdivisions such as entomology, radiology and steels.

Classifications Wanted

The work of enlarging the collection and bringing it up to date is under the direction of the Committee on Special Classifications of the Special Libraries Association. Donations of classifications or requests for further information should be addressed to: Allen Kent, Chairman, Committee on Special Classifications, SLA, c/o School of Library Science, Western Reserve Univ., Cleveland 6.





New "PG" Wheel hikes production 40%

1. PRODUCTION PROBLEM: The Albert Plating Works of Brooklyn, N.Y., in one of its operations, bends, finishes and plates cold-rolled steel tubing chair backs. The finishing procedure—removing stretch marks and blending the steel surface prior to plating—was formerly a two-step job: grinding with a Grit #180 set-up wheel, then surfacing with a grease-coated stitched buff wheel. Production was slow and costs high because of constant wheel dressing.

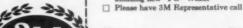
2. **SOLUTION:** A 3M Representative suggested that this company switch to the amazing new "PG" Wheel, Grit #320. The "PG" Wheel, lubricated with tallow, replaces both the set-up wheel and the buff, and has increased production 40%. Down time is cut to the bone because each "PG" Wheel lasts a full week. Too, the "PG" Wheel produces a far superior finish on the tubing, making a superior and more consistent final chrome-plated surface.

A 3M Representative can help you solve your grinding and finishing problems, too. Call him today.

A 3M Representative :-- WANT MORE INFORMATION?

MINNESOTA MINING AND MANUFACTURING CO. Dept. DD-36, St. Paul 6, Minn.

Send me full details about the amazing new "PG" Wheel





																			_	-	-	-	-	_	J	ı
Name	*				*	*			*	T	ï	tl	e				*	*	*		*		*			
Company	*					*	*			*	×		*							×		*	*	*		*
Address.																										
City																										

Made in U.S.A., by MINNESOTA MINING AND MFG. CO., St. Paul 6, Minn. Also makers of "Scotch" Brand Pressure-Sensitive Tapes, "Scotch" Brand Magnetic Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "SM" Abrasives, "3M" Abrasives, "3M" Abrasives, "3M" Abrasives, "3M, London, Ontario.



N E W E Q U I P M E N T

New and improved production ideas, equipment, services and methods described here offer production economies...for more data use the free postcard on page 97 or 98.







Machine chamfers both gear sides simultaneously

A model BME-14 duplex single station deburring and chamfering machine chamfers both sides of a gear simultaneously. The machine removes the sharp edges on the ends of gear teeth and at the same time gets rid of the burrs resulting from the gear cutting process. Spur gears, helicals and straight sided as well as involute form splines from $\frac{5}{8}$ in. to $\frac{61}{2}$ in. pitch diam are described as handled on the unit at a production rate up to 5 teeth per

second per side. Figures for the machine are so designed that they can be replaced with other tooling if production must be shifted to a new gear or spline. Other tooling developed at maker's plant can be dropped in place. Depth of chamfer is reported as infinitely variable with the adjustment being made in the tool holders. Machine, built to JIC electrical standards, has 1 hp motor. Modern Industrial Eng. Co. For more data circle No. 27 on postcard, p. 97

New continuous brazing and sintering furnace developed

A mesh belt brazing or sintering furnace, globar heated for a maximum temperature of 2300°F, has a cooling chamber at the back which is $2\frac{1}{2}$ times the length of the heating chamber. Cooling chamber provides at least two inches of water around the inner section. It has two

water inlets and two atmosphere inlets. The heating chamber is 12 in. wide x 8 in. high x 48 in. long. The alloy belt is 8 in. wide and is driven by a variable drive. Pressure wheels are on driven pulley. Waltz Furnace Co.

For more data circle No. 28 on postcard, p. 97

Hydraulic slotter built for accurate machining

This new addition to a company line of hydraulic shapers, planers and slotters is built in 36 in. and 48 in. stroke-length sizes, and designed for accurate, rapid machining of all metals. One of its features is described as the fact that all cross, longitudinal and rotary movements are full pendant actuated and controlled. The machine is reported as equipped with full hydraulic drive, having two speed ranges, with servo control to the pump so that cutting

speed may be infinitely varied from zero to maximum in either range. Feeds are hydraulic and they also may be infinitely varied from zero to maximum. Two-speed traverse enables operator to position the work to a few thousandths without manual movements. Machine is equipped with a built-in dividing head arranged for power operation. Counter automatically stops table. Rockford Machine Tool Co.

Turret lathes have faster speed changing

Simplified operating controls and faster speed changing through the use of an all-hydraulic headstock are mentioned as important design features of new No. 4 and 5 universal ram type turnet lathes. Individually engineered for the specific

range of work sizes each is capable of handling, both units are said to provide balanced power and maneuverability. Twelve spindle speeds, or 24 spindle speeds with a 2-speed motor. Warner & Swasey Co.

For more data circle No. 30 on postcard, p. 97

BARIUM STEEL—active in America's growth



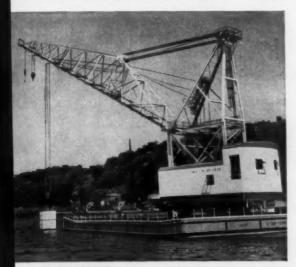


PROCESS PLANT builders shop at Barium, too. This large Gas Scrubber Separater unit (at left) was fabricated by the Plate Division of Barium's Phoenix Iron & Steel Company. Too big to go by railroad, a special truck rig delivered it to the job site at Farrel, Pa.

HIGHWAY CONSTRUCTION won't be slowed down by waterways as long as Barium's Phoenix Bridge Company fabricates steel and builds bridges. This handsome 500 foot, 900-ton continuous deck plate girder highway bridge, was built by Phoenix for the New York State Department of Public Works. It spans the Susquehanna River at Bainbridge, New York.



CHEMICAL INDUSTRIES take advantage of the alert management thinking that has built Barium from 1 to 12 soundly diversified companies in ten short years. Here at Barium's Industrial Forge & Steel Inc., they're rough machining a 7900 lb. carbon steel forged sleeve for a leading chemical concern.



ARMED FORCES have learned what we mean by Barium's integrated operations. Though the Air Forces' biggest (50-ton design capacity) floating crane bears the nameplate of Barium's Wiley Manufacturing Co., four separate Barium companies pooled talents to produce it. Just one more chapter in "The Barium Story"—complete product listing is in Thomas Register, Section A to Z.

AUTOMOBILE gears, shafts and shifters are pounded out on hammers at Barium's Globe Forge, Inc. Automotive springs, fasteners and stampings come from other Barium companies. For more facts on Barium, write Barium Steel Corporation, 25 Broad Street, New York 4, N.Y.



PRODUCERS
Phoenix Iron & Steel Co.
(Plate Div.; Structural
Div.; Steel Tube Div.;
Blast Furnace Div.)

STEEL

STEEL FABRICATORS 4 PROCESSORS

Phoenix Bridge Company
Industrial Forge & Steel,
Inc. • Globe Forge, Inc.
• The Geometric Stamping Company



MANUFACTURERS OF END PRODUCTS

END PRODUCTS
Clyde Iron Works, Inc. •
Erie Bolt and Nut Company • Bayanne Bolt
Corporation • The Cuyahoga Spring Company •
Jacobs Aircroft Engine
Company • Wiley Manufacturing Company

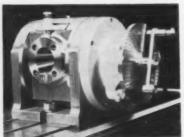
LIGHTWEIGHT METAL AND PLASTICS

East Coast Aeronautics, Inc.

Tracer miller simplifies cutting large work

A three dimensional tracer milling unit is mentioned as making it practical to take numerous cuts on large work pieces by moving the cutter rather than the work piece itself. Ram support of the unit has transverse and longitudinal keyways with suitable mounting provisions on all four sides and the end. The

tracer stylus arm has several manual mounting positions to further increase the possible uses of the unit. Transverse and longitudinal movements of the cutter are 12 in. with the depth movement being 8 in. Shut-off valve for any movement. Sundstrand Machine Tool Co. For more data circle No. 31 on postcard, p. 97



Dividing heads built for high precision work

A new line of precision dividing heads (designed for the manufacturer's universal milling machines), are recommended for high precision work in gear cutting, cam milling, drilling and boring. The dividing head spindle is described as mounted on precision anti-friction bear-

ings and carried in a block having 360° peripheral clamping. Spindle nose and taper hole conform to No. 50 milling machine standard. The block itself is mounted in a housing to allow 145° angular positioning. Cincinnati Milling Machine Co..

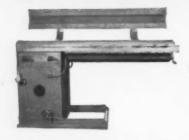
For more data circle No. 32 on postcard, p. 97



Unit made to cut lengths of moldings

The work head and belt guard assembly of one firm's cut-off machine are now being offered as a separate package for use in building specialpurpose machines. The new package is recommended for such applications as the cutting to length of moldings as they emerge from forming machinery. The head features ball bearing assembly, 2 11/16-in.,

3-belt arbor pulley, 31/2-in. and 5-in. wheel flanges, feed handle, motor mounting plate, pivot shaft with roller bearings and adjustable torsion spring. It cuts nonferrous tubing with a max OD of 2 in., nonferrous solids up to 11/2 in. thick, 11/4-in. ferrous tube, stock to 3/4-in. in diam. Rockwell Mfg. Co. For more data circle No. 33 on postcard, p. 97



Seam welder made for inert gas or submerged arc work

This longitudinal seam welder is designed for use with either inert gas or submerged arc welding heads. It is built primarily for light gage welding of stainless and aluminum alloys, but has been used successfully, the maker states, for welding mild steel and steel alloys up to 10 gage in thickness. Six standard models are available, ranging in capacity from 24 in. x 10 gage up to 84 in. x 14 gage. The welder has a bar serving to back up longitudinal seam. Reed Equipment Div., The Webb Corp.

For more data circle No. 34 on postcard, p. 97



Orients and feeds parts up to 8 in. long

Equipped with a 36-in, diam bowl, the EB-3-B Parts Feeder is reported as orienting and feeding parts up to 8 in. long in either a clockwise or counterclockwise direction. It can be equipped with single or dual discharge to gravity feed tracks for automatically feeding parts to processing, packaging and assembly line equipment. Feed rate can be regulated. Syntron Co.

For more data circle No. 35 on postcard, p. 97



Brazing furnaces made for high-temperature services

To assist in the fabrication of products for high-temperature heat transfer services, or other services in which brazed construction can be used advantageously, one manufacturer has designed and installed special brazing furnaces. Photo shows bell furnace with four retort bases. Griscom-Russell Co. For more data circle No. 36 on peetcard, p. 97

Required: Strength . . . Analysis . . . Quality . . . Economy

Specified: ACIPCO Centrifugally Spun



In applications such as the many hydraulic cylinders for the stretch former for aluminum sheet shown here, as well as in hundreds of others — reformer tubes for chemicals, oil well diamond drill bits, heavy duty rolls — Acipco centrifugally spun steel tubes meet the rigid requirements and specifications of design engineers.

Strength properties and exact metal analyses, as well as economy of initial and operating costs, are readily "engineered" into hundreds of tubular product applications through the versatile size and analysis range of Acipco centrifugally spun steel tubes.

Acipco's integrated facilities for casting, heat treating, machining, fabricating and testing — all located "under one roof" — provide prompt service in furnishing "custom-spun" tubes for your specific purpose . . . whether you need two, or two thousand.

Why not find out how, and why, Acipco steel tubes can serve your needs best? It costs nothing to arrange a consultation with Acipco's experienced engineers and metallurgists.

SIZE RANGE: Lengths up to 16'—longer lengths by welding tubes together. OD's from 2.25" to 50"; wall thicknesses from .25" to 4".

ANALYSES: All alloy grades in steel and cast iron, including heat and corrosion resistant stainless steels; plain carbon grades and special non-standard analyses.

FURNISHED: As cast, rough machined, or finish machined, including honing.



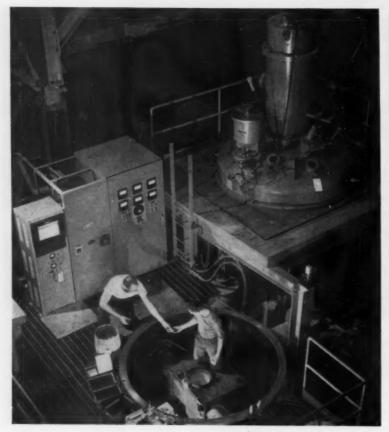


DISTRIBUTORS

Austin-Hastings Co., Inc. 226 Binney St. Cambridge 42, Mess. Peter A. Frusse and Co., Inc. 17 Grand St. New York 13, N. Y.

New York 13, N. Y. Lyman Tube & Bearings, Ltd. 920 Ste. Sophie Lane Montreal 3, Canada J. M. Tull Metal & Supply Co. 285 Moriette St., N. W. Atlante, Co. C. A. Roberts Company 2401 Twenty-fifth Avenue Franklin Park, Ill. Strong, Carlisle & Hammond Co. 1392 W. Third St. Clevelland 13. Ohio

Ducommun Metals & Supply Co. 4890 Sc. Alonede St. Lm Angeles 34, Calif.



CVC vacuum furnace at Blairsville, Pa. plant of Westinghouse Electric Corp.

How a vacuum furnace can grow and save money for Westinghouse

When Westinghouse wanted a flexible, high-vacuum furnace, they came to us with two special requests:

- They wanted a furnace with 350 pounds capacity for development work,
- 2. They wanted to expand this furnace's capacity quickly and economically should the need arise.

Our engineers designed the furnace around a group of modules or "building blocks" to meet these requests.

Westinghouse will up the capacity to 1000 pounds simply by substituting larger crucibles for the 350-pound size now in the furnace. Basically, the rest of the furnace stays the same.

Westinghouse can make the furnace semi-continuous and increase production to 60 tons or more a month of ultra high-purity vacuum metals simply by adding two valved interlocks—one for charging, one for mold removal.

Switching from single to multiple or centrifugal molds requires only a change in the furnace bottom.

In all cases, a minimum number of parts need be purchased.

Three CVC information memos outlining the furnace's design and operation in detail are available on request.

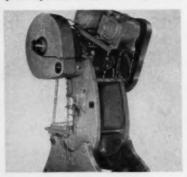
Consolidated Vacuum

a division of CONSOLIDATED ELECTRODYNAMICS CORPORATION, Pasadena, California

Sales Offices: Albuquerque • Atlanta • Boston • Buffalo • Chicago • Dallas • Detroit
New York • Pasadena • Philadelphia • San Francisco • Seattle • Washington, D.C.

Variable speed drives

Shown incorporated on a Walsh press, this variable speed drive is described as taking little more room than a standard horizontal fixed speed motor and permitting the press operator to maintain optimum

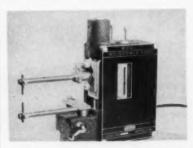


machine operation under changing production conditions. Photograph has been prepared to illustrate the ready accessibility of controls and compactness of their mounting. Sterling Electric Motors, Inc.

For more data circle No. 37 on postcard, p. 97

Welding head

Designed for use with ac (to 1.5 kva) or dc (to 60 watt seconds) power supplies, a new model J welding head is now available. Applications of the unit include welding miniature and subminiature parts such as those used in transistors, thermocouples, lamps and electrical



instruments. Foot treadle operated, the J head is described as producing clean spot welds at high speeds with a minimum of operator fatigue. The unit has been designed for high visibility of work pieces and work handling freedom at the electrodes. Rautheon Mfg. Co.

For more data circle No. 38 on postcard, p. 97

NEW EQUIPMENT

Portable tester

Portable metal harness testers that provide direct readings corresponding to Rockwell A, B or C scales and Brinell medium or low scales are now offered. A direct reading is described as made in seconds, merely by placing the tester on the metal, pressing the handgrips down and reading the dial. Each instrument



is individually calibrated to \pm 1.5 pts Rockwell and 5 pts Brinell. The unit is reported as capable of use on a wide range of metal parts. Furnished in wood case with diamond penetrator and one test block. Newage International, Inc.

For more data circle No. 39 on postcard, p. 97

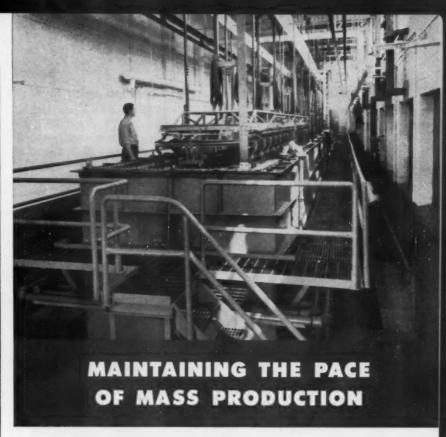
Gyrating flux screen

Introduction of a gyrating flux screen, designed to screen flux for automatic submerged welders, is announced. The unit was developed to remove scrap and fused flux from the usable flux. The good flux is discharged into the boot of a bucket elevator and returned to the weld-



ing machine. The gyrating screens have balanced mechanical action which concentrates vibration on the screen deck and reportedly they transmit little or no vibration to the welding machine. Simplicity Eng. Co.

For more data circle No. 40 on postcard, p. 97



This Udylite Machine Cleans, Plates and Processes 480 Auto Grilles per hour AUTOMATICALLY

A complete production operation—applying nickel-chrome plate to steel radiator grilles—is handled by three men and this Udylite machine. The entire operation of cleaning, plating and rack strip are handled by the machine—the loading and unloading of parts are the only manual operations. The stampings are approximately 8" x 36" in size and to assure them of a flawless finish Udylite installed a Horizontal Cathode Agitator. In addition, a high current density chrome strike is applied before the chrome plate.

This is just one more example of how Udylite machines are meeting the pace of mass production. And Udylite machines are adaptable to practically any metal finishing operation you can name. Why don't you find out more about how Udylite can fit into your operations? Just call your nearby Udylite representative or write direct for the full details. There's no obligation.



WORLD'S LARGEST PLATING SUPPLIER

Face milling machine

A new mill-all beam and column mill is designed to do a wider variety of facing jobs. It is recommended for facing structural steel beams and columns and other structural steel sections and fabrications; facing steel and iron castings, forgings, weldments, die blocks; and chamfering plates and bars. Kling Brothers Eng. Works.

For more data circle No. 41 on postcard, p. 97

Test indicator features convenient mounting system

Due to the mounting arrangement on a new test indicator it is reported as providing adequate visibility of the dial, obviating the need for any additional instrument with dial perpendicular. The unit, designated as the Check Master, is said to possess a number of advantages for both setup work on a surface plate and the trueing of pieces in machines tools. One model of the



indicator reads to 0.0001 in. and the other in either 0.0001 in. or, with a simple change to a longer contact point, in widely spaced divisions of 0.001 in. Standard Gage Co., Inc.

For more data circle No. 42 on postcard, p. 97

Wet abrasive cutter

This heavy-duty, high-speed abrasive cutting unit permits the cutting of medium-sized bar stock and similar product through an oscillating cutting principle. Equipped with a large diam abrasive cutting wheel, up to 18 in., for certain applications, it is described as severing sheets, angles, channels, pipes, tubes and solids of practically all analyses. The machine is an oscillating type in which the wheel and work are fed manually and its work



clamps are operated by a foot treadle. Through this motion, the amount of abrasive wheel contact is materially reduced as cutting is performed with a minimum of wheel pressure. It is reportedly capable of cutting 3 in. diam solids, 4 in. diam tubing and 6 in. x 1 in. steel plate at 90° to axis. American Chain & Cable Co., Inc.

For more data circle No. 43 on postcard, p. 97



"Doc, dermatitis control is simple as 1-2-3-4-5."

An exaggeration?

Not at all, Occupational skin irritation can be prevented. Simply. At surprisingly little cost.

— with the WEST Dermatitis Prevention and Control Program that:

- 1-insures personal cleanliness
- 2-protects exposed skin areas
- 3-prevents clothing contamination
- 4—guards against special hazards
- 5—provides continuous consultation,

Workers free of skin irritation can save you hundreds, perhaps

thousands, of dollars each year — by eliminating the cost of:

- —medical treatment
- -enforced idleness
- -absenteeism
- -sacrificed quality
- -lowered morale
- -production lags.

THE WEST Program for controlling skin irritations is based on individual shop requirements and an in-your-shop survey, made without obligation. Let a WEST representative plan the details.

OLDEST AND LARGEST COMPANY OF ITS KIND IN THE WORLD



Branches in Principal Cities

FREE BOOKLET

Use your business letterhead to request our 24 page booklet "The Control of Dermatitis in Industry."

WEST DISINFECTING COMPANY Dept. IA, 42-16 West St. Long Island City I, N. Y.

In Canada: 5621-23 Casgrain Avenue, Montreal

Wrought steel alloy

Manufacture is announced of precision balls of wrought SR steel alloy No. 11A-1132. The alloy is reported as having high corrosion resistance at both room and elevated temperatures. It has a tensile strength of 95,000 psi, a yield strength (0.2 pct offset) of 75,000 psi at room temperature and a tensile strength of 63,000 psi at 1200°F. It can be hardened to about 40 Rc, and has a non-magnetic austenitic structure. Balls of this material are available in any standard or special size desired, from 1/16 in. to 6 in. diam, and in large or small quantities. Accuracy can be held to \pm 0.000050 in. on size and 0.000050 in. on sphericity in the smaller sizes, and to \pm 0.001 in, and 0.0005 in, respectively on 6 in. balls. Industrial Tectonics Inc.

For more data circle No. 44 on postcard, p. 97

Cabinet-mounted lathe

This unit 750 (shown mounted on the cabinet) has a ball bearing headstock, a runout of less than 0.0001 in. at headstock, lever collet closer, V-belt drive, six position turret having $\frac{5}{8}$ in. holes for tools, compound rack and pinion slide rest and a front tool post having a swing of 360° . Overall length of lathe is 24 in., bed length 22 in., and



swing 5.905 in. Spindle speeds are variable, depending on pulley ratio, up to 10,000 rpm. The unit has a 5/16 in. capacity through the headstock. Cabinet has an overall length of 54 in. F. W. Derbyshire, Inc.

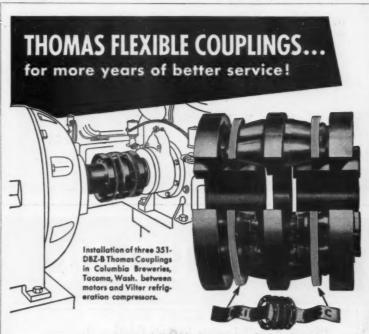
For more data circle No. 45 on postcard, p. 97

Dial thickness gages are fully adjustable

A new series of adjustable dial bench gages for measuring the thickness of tubing, sheet material and other similar products are announced. The gages are equipped with a precision mandrel on which the work is positioned and a dial indicator which magnifies the dimension, it is stated, so that it can be read with ease. Throat depth of the gages can be varied.



Federal Products Corp.
For more data circle No. 46 on postcard, p. 97



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.

DISTINC	TIVE ADVANTAGES	
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.	
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.	Thomas Couplings are made for a wide
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.	range of speeds, horsepower and shaft sizes and can be assembled or
CAN NOT	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.	disassembled without disturbing the connected machines, except in rare instances.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling, Elastic Constant Does Not Change, Original Balance is Maintained.	

THOMAS FLEXIBLE COUPLING COMPANY

Largest Exclusive Coupling Manufacturer in the World WARREN, PENNSYLVANIA, U.S.A.

This advertisement is neither an offer to sell nor a solicitation of offers to buy any of these securities.

The offering is made only by the Prospectus.

NEW ISSUE

March 8, 1956

164,117 Shares

Crucible Steel Company of America Common Stock

Holders of the Company's outstanding Common Stock are being offered rights to subscribe at \$40 per share for the above shares at the rate of one share for each ten shares of Common Stock held of record on March 7, 1956. Subscription Warrants will expire at 3:30 P.M., Eastern Standard Time, on March 21, 1956.

The several Underwriters have agreed, subject to certain conditions, to purchase any unsubscribed shares and, both during and following the subscription period, may offer shares of Common Stock as set forth in the Prospectus.

> Copies of the Prospectus may be obtained from any of the several underwriters only in States in which such underwriters are qualified to act as dealers in securities and in which the Prospectus may legally be distributed,

> > The First Boston Corporation

Kuhn, Loeb & Co.

Smith, Barney & Co.

Merrill Lynch, Pierce, Fenner & Beane

Reynolds & Co., Inc.

"Stays Alive" Longer in Anti-Friction Bearings

Over the years, many manufacturers have endeavored to develop lubricants to compete with NON-FLUID OIL, but none has succeeded in matching the desirable characteristics of this superior lubricant.

NON-FLUID OIL "stays alive" longer, lubricates dependably, until entirely consumed, protecting costly anti-friction bearings and prolonging their life. Dollar for dollar, pound for pound, day in and day out, NON-FLUID OIL gives more and better lubrication.

NON-FLUID OIL, the best buy in lubricants, is the only one that stands up. It stays in your bearings three times as long as ordinary greases. Write for free testing sample and descriptive bulletin . . . no obligation, of course.

NEW YORK & NEW JERSEY LUBRICANT COMPANY

292 MADISON AVE., NEW YORK 17, N. Y. WORKS: NEWARK, N. J.



Birmingham, Ala. Atlanta, Ga. Columbus, Ga. Charlotte, N. C.

Greenville, S. C. Chicago, III. Springfield, Mass. St. Louis, Mp.

WAREHOUSES

Greensboro, N. C. Detroit, Mich. Providence, R. I.

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

NEW EQUIPMENT

Electric furnace

Introduction is announced of a new multi-tube high temperature electric furnace that has been designed to suit situations where comparatively large quantities of small parts must be sintered under identically controlled conditions. Initially developed to meet special requirements in the sintering of ferrites of small dimension, it is



described by the manufacturer as readily adaptable to many other ceramic and metallurgical processes. The basic design is described as giving relatively large tube capacity in a minimum space. It incorporates twelve pure alumina tubes, each 7/8 in. ID x 30 in. long, with 8 silicon carbide type heating elements surrounding the inner bank of tubes. Pereny Equipment Co.

For more data circle No. 47 on postcard, p. 97

Furnace door hose

All materials in a new openhearth furnace door hose, the maker states, were selected to resist the natural hazards encountered in openhearth steelmaking. The hose consists of a tube made with a special rubber compound to handle hot water and steam. The outside of the hose is covered with an open braid of stainless steel wire that will not rust. Manufactured with inside diameter sizes of 1 in., 11/4 in., and 11/2 in., the hose will be furnished in 45 to 50 ft lengths or specified lengths on special order. Goodyear Tire & Rub-

For more data circle No. 48 on postcard, p. 97



NOW...the expanded line of KENDEX* Tooling

meets broad range of job requirements

The ever increasing demand for Kendex tooling is indicative of the wide application of the Kendex principle to all types of machines: turret lathes, engine lathes, planers, milling machines, and automatic cycling machines. To most this growing demand, Kennametal† has more than doubled the number of sizes of Kendex toolholders, and now offers a complete line of inserts for all holders and job requirements. This expanded line now includes:

- 17 Kendex holder styles and 101 different tool sizes in a rugged, simple, trouble-free design . . . proven on a broad range of applications
- a wide selection of standard nose radii (nonstandard radii also available at slight added cost)

 a complete line of Kennametal inserts for all job requirements . . . to fit all tool holders now in use

Thus, Kennametal now offers the exact style of Kendex tooling you need . . . positive or negative rake holders: square, triangular, round or heavy duty inserts with correct nose radii for use with your present holders. Regular inserts (ground top and bottom only) and precision inserts (all surfaces ground) are stocked in a broad range of grades.

Why not discuss your tooling problems with a Kennametal tool engineer and let him show you how Kennametal tooling can provide the right answer on any machining job. Or write to Kennametal Inc., Latrobe, Pennsylvania,

*Registered Trademark; Patent applied for

†Registered Trademark

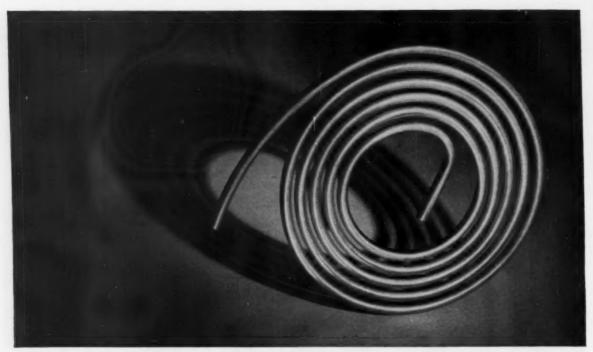
Give your machines the tools they deserve . . . the BEST





KENNAMETAL
... Partners in Progress





Superior offers the widest range of sizes and alloys in top quality instrument tubing

Superior Tube Company produces the finest instrument tubing in a wide range of sizes and alloys—offers you as standard products what many makers would classify as specialty tubing.

1. NEEDLE TUBING

The stainless steel links in this recording instrument are made of Superior needle tubing. The high strength, stiffness, and strict dimensional tolerances characterizing this tubing—originally designed for surgical uses—have opened new fields of industrial applications when used as mechanical tubing.

2. PRESSURE AND SUPER PRESSURE TUBING

A spiral windpipe made of Superior 304 cold-drawn seamless stainless steel tubing. Pressure tubes are used to convey fluids at elevated temperatures and pressures. Produced in stainless, carbon and alloy steels in sizes to withstand pressures up to 100,000 psi.

3. BOURDON TUBING

A "C" tube element for a pressure gage. The shaped Bourdon tube serves as the actuating element for the majority of pressure indicating and recording instruments. Helix and spiral elements are also fabricated from the wide range of alloys available at Superior—a range that makes it

possible to satisfy any set of conditions in the use of Bourdon tubing.

4. CAPILLARY TUBING

A thermostatic instrument pressure transmission element with a coiled unit made of Superior Type 321, capillary tubing. Superior capillary tubing is used primarily for transmitting temperature and pressure impulses from the source to a recording or indicating instrument. Capillary purposes, in general, require a heavy-wall tube with an ID of .006" to .090". Types 347, 321, 316, Monel and carbon steels are recommended analyses.

5. LARGE OD LIGHT WALL TUBING

A large OD light wall tubing bellows in a pressure actuating element. Present applications for large OD light wall tubing include bellows, low pressure heat exchanger tubes, flexible hose, aircraft ducting, fractional horsepower motor casings, ceramic drills, and casings for radioactive well logging instruments. Sizes offered up to 2½" OD.

6. MECHANICAL TUBING - INSTRUMENT LINE

Various fabricated parts—all made of Superior mechanical tubing. Superior mechanical tubing can be either seamless or Weldbarwit grade used statically or dynamically, but not subjected to severe temperature or pressure. It is produced in sizes up to \(^{5}\gamma^{\text{''}}\) OD within production limits, in many special shapes, and in over 63 standard analyses and mechanical properties.

Send for free copy of Bulletin 40— A Guide to the Selection and Application of Superior Tubing, Write Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

Round and shaped tubing available in Carbon, Alloy and Stainless Steels; Nickel and Nickel Alloys; Beryllium Copper; Titanium; Zirconium



*Reg. T.M. International Nickel Co.
†Reg. T.M. Superior Tube Co.

NORRISTOWN, PA.

All analyses .010" to %" OD-certain analyses in light walls up to \$14" OD

On the West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif.



The Iron Age SUMMARY . . .

Steel industry looks to its own problems . . . How to maintain full production is big worry . . . How to finance expansion is another . . . Many are oversold.

Big Problem . . . Biggest problem confronting steel producers is how to maintain production at a high level in face of continuing strong demand and substantial order backlogs.

With the "recession" myth definitely pegged as more imagination than substance, the mills are pushing desperately to keep the wheels turning against the odds of inclement weather and inevitable maintenance interruptions.

From the long-range view, producers are concerned about their own expansion programs. Some of them are threatened with delay for lack of structural steel. Financing is another big hurdle for the mills. (See page 38.)

"Where is the expansion money coming from?" is important to steel consumers as well as producers. A better return on sales is one avenue that steel firms are exploring with a great deal of concentration. There probably will be squawks from customers, but the need for more capacity is urgent. Higher prices are one way to buy new capacity to avoid recurring shortages.

Mills Fooled . . . It now looks as though some mills may have oversold for first half. They were "taken in" by the slight automotive letdown and booked orders to offset this decline. But with automotive coming back and industry generally pitching for more steel, consumers probably will find deliveries running behind schedule.

Meanwhile, steel scrap prices are bouncing back from the downturn that set in in late January. Markets generally are firming up or moving to higher ground. Scrap dealers' yards are pretty well cleaned out of inventory, and brokers are having trouble filling old orders. Extreme winter weather conditions are slowing movement of scrap to mills.

The comeback in scrap reflects the generally optimistic outlook in steel. More steel executives are going out on the limb to predict near-capacity operations for the full year. Year-end predictions were limited to first half or first nine months.

Behind Optimism . . . This change in attitude is based on the improved outlook in Detroit and the demonstrated continuing demand for consumer goods, private and industrial construction, freight car building, and boom times in oil and gas fields.

Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week 2,462	Last Week 2,474	Month Ago 2,437	Year Ago 2,268
Ingot Index (1947-1949=100)	153.5	154.0	152.4	141.0
Operating Rates				
Chicago	99.5	100.5*	98.5	99.0
Pittsburgh	101.0	103.0	103.0	95.0
Philadelphia	105.0	104.0	103.0	94.5
Valley	99.0	98.0*	97.0	94.0
West	101.0	101.5*	98.0	95.0
Detroit	103.0	101.0	93.0	90.0
Buffalo	105.0	105.0	105.0	100.0
Cleveland	107.0	108.0*	105.5	97.5
Birmingham	86.0	88.0	95.0	87.5
S. Ohio River	91.0	91.0*	96.5	87.0
Wheeling	98.0	100.0*	100.0	95.0
St. Louis	100.0	101.0	106.0	95.0
Northeast	90.0	89.0	85.0	80.0
*Revised	100.0	100.5	99.0	94.0

Prices At A Glance

(cents per lb unless otherwise	noted) This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.174	5.174	5.174	4.797
Pig Iron (Gross Ton)	\$59.09	\$59.09	\$59.09	\$56.59
Scrap, No. 1 hvy				
(gross ton)	\$50.17	\$48.83	\$48.67	\$37.50
Nonferrous				
Aluminum ingot	24.40	24.40	24.40	23.20
Copper, electrolytic	46.00	46.00	46.00	33.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	33.25	33.25	33.25	27.75
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	100.50	102.00	101.00	91.125
Zinc, E. St. Louis	13.50	13.50	13.50	11.50

Price Cut In Type 430 Sheets

Washington Steel takes lead in price move to encourage more use of non-nickel stainless... Reduction not applicable to strip... Steel outlook strong.

◆ TO ENCOURAGE more widespread use of non-nickel-bearing stainless steel, Washington Steel Corp. has reduced the price of Type 430 stainless sheets by \$45 per ton. The reduction does not apply to Type 430 strip.

T. S. Fitch, chairman and president, announced a new base price on 430 sheets of 34.50¢ per lb. This increases the differential between Type 430 and Type 302, a popular 18-8 grade, to \$200 per ton.

Mr. Fitch explained that continuing shortage of nickel, plus high prices for this alloying metal, are compounding the difficulties of producers and consumers of nickelbearing stainless steels. He added that deliveries of these grades have become extended and, in some cases, may have forced fabricators to curtail operations and shelve plans to expand capacity. He pointed out that Washington Steel is in a position to make deliveries on Type 430 sheets the first week in April.

Washington Steel will continue to supply 18-8 stainless grades on so-called "rated" business—where the Government sees to it that nickel is made available.

Meanwhile, as mills generally prepare to open third quarter order books, outlook is for continued tight supply and high production levels. As things shape up now, steel production may well hit 120 million ingot tons this year.

PRICES...U. S. Steel Export Co. has announced price revisions of export price bases with freight included to New York, Philadelphia and Baltimore. The prices become effective concurrently with, and reflect, the higher export freight rates applicable on railroad shipments to North American seaboard ports.

Semifinished steel prices are up 43¢ a net ton. Finished steel increases range from 20¢ to 60¢ a ton. Rails went up 41¢ a ton. Electrical sheets are up 40¢ a ton. Tin mill products are up 2¢ per base box. Buttweld and seamless pipe prices rose 10¢ to 30¢ a ton on a discount basis. Semifinished alloy steels are up 43¢ a ton. Finished alloy steel prices rose 20¢ to 40¢ a ton.

New freight rates are also reflected in mill price changes of Kaiser Steel Corp. Kaiser changes include. Continuous weld pipe, up \$2 per net ton; electric weld pipe, up \$1 per net ton; basic and foundry pig iron, up \$1.50 per net ton. Prices of blooms, billets and slabs are up \$2 per net ton. Prices of plates, structurals, sheets, and strip up \$1 per ton generally. Cold rolled carbon strip, no change; hot rolled alloy strip, up \$2 a ton; shell steel billets, no change. Bars and small shapes are unchanged.

U. S. Steel Corp. raised prices of single loop bale ties 2 columns; merchant wire annealed, 10¢ per cwt; merchant wire galvanized, 10¢.

SHEETS AND STRIP . . . In Detroit, demand is holding up well. Not all orders have been placed for June but auto companies who are on the books are down for full allotments. Demand for flat rolled products continues strong in Pittsburgh. Mills will officially open their books around the

Purchasing Agent's Checklist

STEEL: Market stays tight ... p. 127

first of April for the third quarter. Producers go into the order period with large amount of production unofficially committed. They are mindful of the speed with which the situation can change, as cancellations can be made until the time an order goes into production, but producers were generally encouraged by the failure of auto cutbacks to weaken the market.

BARS... West Coast mills have their hands full keeping up with the demand. Despite some automotive cutbacks, there's no letup foreseen for many months to come. In Detroit, the situation is touch and go. Some automakers can't make up their minds what they want. One company moved May allotments to June and now wants them moved back to May. Hot top bars are still very scarce.

GALVANIZED . . . Demand for galvanized sheet is reported strong in Pittsburgh. One mill reports solid bookings for the second quarter and the prospect of even stronger demand in the coming months. For one thing, the recently announced grain storage program of the government figures to gobble up galvanized sheet. Full requirements of the program are not known as yet but the need for grain bins is sure to keep pressure on the galvanized market.

PLATE AND STRUCTURALS... Construction work all over the West Coast is keeping mills hopping. Pacific Northwest dam projects and California office and factory construction are leading the way. Elsewhere, the picture is much the same. Pittsburgh mills report no easing. Construction and railroad buyers are lined up for production months ahead.

STAINLESS... Regular customers in Detroit are not having too much trouble getting stainless now. Supply has eased since the last major auto cutback. However, a Pittsburgh producer felt there had been little or no weakening of the stainless market.

WAREHOUSES . . . West Coast warehousemen say things are fine as long as they can keep their customers supplied. But they're having a tough time staying friends with users of flat-rolled products. Elsewhere, the warehouse picture is strong. Prospect of increased prices in the early summer bars any letdown in demand.

Comparison of Prices

(Effective March 20, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type;

advances over previous week are printed in Heavy Type;

declines	appear	in	Italics.

	Mar. 20 1956	Mar. 13 1956	Feb. 21 1956	Mar. 22 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.3624	4.325 €	4.325€	4.05€
Cold-rolled sheets	5.325	5,325	5.825	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.37	4.325	4.325	4.05
Cold-rolled strip	6.29	6.29	6.29	5.79
Plate		4.52	4.52	4.225
Plates, wrought iron		10.40	10.40	9.30
Stainl's C-R strip (No. 302).	. 44.50	44.50	44.50	42.00
Fin and Terneplate: (per base b	ox)			
Tinplate (1.50 lb.) cokes	. \$9.05	\$9.05	\$9.05	39.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.76
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	. 4.65¢	4.65€	4.65€	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars		5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Structural snapes	38.25	28.25	38.25	35.50
Stainless bars (No. 302) Wrought iron bars	. 38.25	11.50	11.50	10.40
wrought from bars	. 11.00	11.00	11.00	10.40
Wire: (per pound)				
Bright wire	6.55¢	6.25¢	6.25¢	5.75¢
Rails: (per 100 lb.)				
Heavy rails	. \$4,725	\$4,725	\$4,725	84.45
Light rails		5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	. \$68,50	\$68,50	\$68.50	864.00
Slabs, rerolling		68.50	68.50	64.00
Families billion	84.50	84.50	84.50	78.00
Forging billets	96.00	96.00	96.00	86.00
Alloy blooms, billets, slabs	. 90.00	96.00	96.00	30.00
Wire Rod and Skelp: (per poun				
Wire rods				
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per	pound)			

	Mar. 20 1956	Mar. 13 1956	1956	Mar. 22
Pig Iron: (per gross ton)	2000	2000	2000	
Foundry, del'd Phila	\$63.69	\$63.69	\$63.69	861.19
Foundry, Valley		59.00	59.00	56.50
Foundry, Southern Cin'ti		62.93	62.93	60.43
		55.00	55.00	52.88
Foundry, Birmingham	55.00			
Foundry, Chicago	59.00	59.00	59.00	56.50
Basic, del'd Philadelphia		62.77	62.77	60.27
Basic, Valley furnace	58.50	58.50	58.50	56.00
Malleable, Chicago	59.00	59.00	59.00	56.50
Malleable, Valley	59.00	59.00	59.00	56.50
Ferromanganesel, cents per lb.	9,50€	9.50d	9.50€	9.504
74.76 pct Mn base.				
Pig Iron Composite: (per gross				
Pig iron	\$59.09	\$59.09	\$59.09	\$56.59
Serap: (per gross ton)				
No. 1 steel, Pittspurgh	\$51.50	849.50	\$49.50	\$38.50
No. 1 steel, Phila. area	50.50	49.50	50.50	38.50
No. 1 steel, Chicago		47.50	46.00	35.50
No. 1 bundles, Detroit		44.50	44.50	29.00
Low phos., Youngstown		54.50	53.50	37.50
No. 1 mach'y cast, Pittsburgh.		55,50	55.50	43.50
No. 1 mach'y cast, Philadel'a.		54.50	54.50	44.50
No 1 mach'y cast, Thinace a.		50.50	50.50	40 50

No. 1 mach'y cast, Chicago .. 53.50 52.50 50.50 46.50 Steel Scrap Composite: (per gross ton)
No. 1 heavy melting scrap ... \$50.17 \$37.50 848.83 348,67

Coke, Connellsville: (per net ton at oven) Furnace coke, prompt \$14.25 Foundry coke, prompt 16.25 16.25 16.25 16.75

Nonferrous Metals: (cents per pound to large buyers) | Nonferrous Metals: (cents per pound to Copper, electrolytic, Conn. \$46.00 Copper, Lake, Conn. 46.00 Tin, Straits, New York 100.50† Zinc, East St. Louis 13.50 Lead, St. Louis 15.80 Aluminum, virgin ingot 24.40 Nickel, electrolytic 64.50 Magnesium, ingot 33.25 Antimony, Laredo, Tex. 33.00 † Tentative. \$ Average. * Revised. \$46.00 46.00 43.00 101.00 13.50 15.80 24.40 33.00 91.125 102.00 13.50 15.80 24.40 11.50 14.80 23.20 64.50 64.50 67.67 33,25 33,25 33.00 33.00 28.50

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Phila-delphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Phila-delphia and Chicago.

PIG IRON

Dollars per gross ten, f.e.b., subject to switching charges.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

← To identify producers, see Key on P. 140->

Producing Poin!	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	60.50	61.00	61.50	62.00	
Birdsboro, Pa. B6	60.50	61.00	61.50	62.00	
Birmingham R3	54.50	55.00°			
Birmingham W9	54.50	55.00°	59.00		
Birmingham U4	54.50	55.00*	59.00		
Buffalo R3	58.50	59.00	59.50	60.00	
Buffalo H1	58.50	59.00	59.50		
Buffalo W6	58.50	59.00	50.50	60.00	
Chester C17	60.50	61.00	61.50		
Chicago 14		59.00	59.00	59.50	
Cleveland A5	58.50	59.00	59.00	59.50	63.50
Cleveland R3		59.00	59.00	59.50	
Duluth 14		59.00	59.00	59.50	
Erie 14	58.50	59.00	59.00	59.50	
Everett M6		62.50	63.00		
Fontana K1	66.00	66.50			
Geneva, Utah C7	58.50	59.00			
Granite City G2.	60.40	60.90	61.40		
Hubbard Y1			59.00		
Lone Star L3		55.00			
Midland C11	58.50				Acres.
Minnegua C6	60.50	61.00	61.50		
Monessen P6	58.50				· cores
Neville Is. P4	58.50	59.00	59.00		
N. Tonawanda T	1	59.00	59.50		
Pittsburgh U1	. 58.50			59.50	
Sharpaville S3	. 58.50	59.60	59.80	59.50	
So. Chicago R3	. 58.50		59.00	1	
Steelien B3		61.00	61.50	62.00	66.5
Swedeland A2 .		61.00	61.50	62.00	
Toledo /4	58.50	59.00	59.00	59.50	
Troy, N. Y. R3.	60.50	61.00	61.50	62.00	66.5
Youngstown YI.			59.00	59.50	

DIFFERENTIALS: Add, 50¢ per ten for each 0.25 pct nilicon or pertion thereof over hase (1.75 to 2.25 pct except law phes., 1.75 to 2.00 pct) 30¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, 32 per ten for 0.5 to 0.75 pct nickel, 31 for each additional, 0.25 pct nickel. Silvery Iran Buffalo, HI, 368.75; Add 31.00 for 0.31-0.69 pct phes.
Silvery Iran Buffalo, HI, 368.75; Jacksen, JI, GR, 506.750. Add 31.25 per ton for each 0.50 pct silicen ever hase (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Beasemer ferrocilicon prices are \$1 over comparable silvery iron.

Product	301	382	303	304	316	321	348	410	416	430
Ingets, receiling	17.75	19.00	_	20.25	31.50	25.00	33.75	15.00	-	15.25
Slabs, billets, recolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50		19.75
Forg. discs, die blocks, rings			-	-	-	-	-	-	-	-
Billets, forging	31.75	32.00	34.75	33.75	51.25	38.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	69.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	-	36.75
Strip, hot-rolled	32.00	34.50	-	37.25	58.25	44.25	50.75	-	-	-
Strip, cold-rolled	41.00	44.50	-	47.25	68.25	54.25	73.50	36.25	-	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheetz: Midland, Pa., C/1; Brackenridge, Pa., A3; Butler, Pa., A7; McKeesport, Pa., U1; Washington, Pa., W2, (2.25¢ lower on Type 430) J2; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., J2; Ft. Wayne, J4; Philadelphia, D5.

Strip: Midland, Pa., C1; Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Middletown, O., A7; Harrison, N. J., D3; Youngstown, C5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (.25¢ per lb higher); New Bedford, Massa, R6.

Bar: Baltimore, A1; Duqueane, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1, F1; Bridgeville, Pa., U2; Dunkirk, N, Y., A3; Massillon, O., R3; Chicago, U1; Syracuse, N. Y., C11; Watervilet, N, Y., A3; Waukegan, A5; Canton, O., T5; Ft. Wayne, I4; Philadelphia, Detroit, R3.

Wite: Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2.

Structurals: Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11.

Plates: Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., 12; Middletown, A7; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C15; Philadelphia, D5.

Forged discs, die blocks, rings: Pittsburgh, C11; Syracuse, C11; Ferndale, Mich., A3; Washington, Pa., J2.

Forgings billets: Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5.

Prices Continue to Climb

Chicago, Valley and Pittsburgh report new advances in openhearth grades . . . Detroit demand outruns supply . . . Snow slows activity in the East . . . Composite up.

• SCRAP prices continue to move up in Pittsburgh, Chicago and the Valley. Most areas report brokers having trouble covering orders in the rising market.

In Chicago best steelmaking grades advanced \$1 to \$49.00. No. 1 railroad heavy melting was up \$1 to \$53.00. New prices brought little relief to brokers, who were reported paying as high as \$55 for No. 1 RR heavy melting.

In Youngstown, No. 1 heavy melting advanced \$2 as three major Valley sales of industrial scrap at higher figures were reported. Despite rising prices and reports that scrap was being pulled in from other districts, brokers were having trouble locating enough good scrap. Feeling was that the mills would have to depend more than ever on secondary grades and there was a possibility that the old No. 3 bundle might return to trading.

In Detroit, the outlook was for slightly more scrap in April but still not enough to match the demand. In the East, heavy snowfalls early in the week brought scrap activity to a standstill.

On the basis of increases in Chicago and Pittsburgh, THE IRON AGE Composite for No. 1 heavy melting steel scrap rose \$1.34 to \$50.17.

Pittsburgh . . . Prices of steelmaking grades have advanced another \$2 on the basis of broker buying and strength of related markets. . Activity continues to be on old orders as the mills are sitting tight. No one knows exactly where the market will come to rest but right now all grades look strong. Cast grades, which have been tight for some time, are up \$2. Low phos, punchings plate, has moved up \$2. General uncertainty is restraining activity at all levels.

Chicago . . . With railroad lists advancing and with neighboring areas advancing their prices to avoid further loss of scrap to the Chicago district, Chicago prices continued to advance and it was generally felt that even at the new prices, brokers would have difficulty in covering tonnage orders. Broker buying of as high as \$55 per ton for No. 1 RR heavy has been reported, and buying in every grade has grown increasingly difficult. At press time last week, broker buying prices were already advancing to consumer delivered levels and the same thing is happening again this week. A rash of mill sales, followed by open orders from larger mills in the district, boosted the tension

Philadelphia . . . Action in the scrap market was pinned down by the blizzard that covered the area early in the week. Underlying strength of the market here and price increases in other areas and broker activity here raised openhearth grades \$1.

New York . . . Heavy snowstorms along the eastern seaboard slowed the market to a walk early in the week. Although no new sales were reported, broker activity and higher prices in adjacent market areas brought steelmaking grades up \$1. The snow also will contribute to low dealer inventories.

Detroit . . . The outlook remains very bullish here. The market continues to maintain its strong tone and may be even stronger by the end of the month. Main reason is that the demand will exceed the supply even though there will be slightly more scrap available in April.

Cleveland . . . Primary grades went up \$2 in Valley and sympathetically in Cleveland last week as market caught fire at mid-week with 3 major Valley sales of industrial scrap at up to \$59. Despite higher prices little prime scrap is to be found and automotive lists for April are expected to have continued low tonnage and spirited bidding. Mills will probably have to depend more than ever on secondary grades to fill tonnage requirements and the old No. 3 bundle may return to trading. Closing the gap between primary and secondary grades may bring out some additional tonnage. In purchases last week in the Valley, one mill bought industrial scrap at \$57 and two at \$59 for special grade.

Birmingham . . . Despite strength in Northern markets, the steel scrap market in the South, beset by labor troubles and with sizeable inventories, continues weak. An area mill came back into the market as indicated earlier, but purchased very limited quantities. Some scrap continues moving out of the South by rail and barge to Northern consumers.

St. Louis . . . Cast iron car wheels were sharply up \$6 per ton and other items in railroad lists closing last weekend were \$1 to \$2 higher. The market continues strong as the result of pressure from other markets and advances in primary grades are expected. The steel operating rate is down 7 points to 99.6 pct.

Cincinnati . . . Market taking on frantic undertone in all grades with broker buying up to \$1.50 on primary grades. Some shortage of scrap anticipated next month with shipments to upriver mills as far as Pittsburgh where some scrap is going for \$53-55 delivered by barge. Floods currently stopping river shipments and scrap being held in Louisville until crest is past.

Buffalo... Overall strength of outside markets continues to bolster prices here. If the Valley market maintains its strength, prices in Buffalo may move upward slightly.

Boston . . . Prices of No. 1 steelmaking grades are up \$1 in Boston as the market continues to show good activity on both the domestic and export fronts. Electric furnace, 3 ft and under, is up \$1. No. 1 machinery cast and mixed cupola cast have also advanced \$1.

West Coast . . . Markets are quiet in Los Angeles, San Francisco, and Seattle. Mills are getting all the scrap they want. Exporting continues quiet.



Write for Your Copy of the CARMET CATALOG

Just out . . . 32 well-illustrated pages, containing data on all Carmet grades, and on Carmet blanks, tools, die sections, punches, draw die inserts, etc.; also special preforming to order. · Write for your copy.

ADDRESS DEPT. A-751

For maximum wear, save with Carmet-preformed to practically any shape or size! Examples: entire blanking die parts; inserts for drawing, heading, extruding and blanking dies; gauge and wear parts, pins, bushings, etc. They can be supplied preformed—with minimum grind stock allowed-or precision ground and ready for use. Let us work with you . . . send us your drawings and specifications for quotations. Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Mich.

For ALL your CARBIDE needs, call Allegheny Ludlum



Pittsburgh

No. 1 hvy. melting \$51.00 to	\$52.00
No. 2 hvy. melting 47.00 to	48,00
No. 1 bundles 51.00 to	52,00
No. 2 bundles 44.00 to	45.00
Machine shop turn 34.00 to	35.00
Mixed bor, and ms. turn 34,00 to	35.00
Shoveling turnings 37.00 to	38.00
Cast iron borings 37.00 to	38.00
Low phos. punch'gs plate 58.00 to	59.00
Heavy turnings 46.00 to	47.00
No. 1 RR hvy. melting 56.50 to	57.50
Scrap rails, random lgth 63.00 to	64.00
Rails 2 ft and under 68.00 to	69.00
RR. steel wheels 60.00 to	61.00
RR. spring steel 60.00 to	61,00
RR. couplers and knuckles 60.00 to	61.00
No. 1 machinery cast 57.00 to	58.00
Cupola cast 51.00 to	52.00
Heavy breakable cast 47.00 to	48.00

Chicago

No. 1 hvy. melting	00 242	to	\$49.00
No. 2 hvy. melting	39.00		40.00
No. 1 factory bundles	53.00		54.00
No. 1 dealers' bundles	48.00		49.00
No. 2 dealers' bundles	37.00		38.00
Machine shop turn	29,00		30.00
Mixed bor, and turn	31.00		32.00
Shoveling turnings	31.00		32.00
Cast iron borings	31.00		32.00
Low phos. forge crops	57.00		58.00
Low phos. punch'gs plate.	54.00		55.00
Low phos. 3 ft and under.	53.00		54.00
No. 1 RR. hvy. melting	52.00		53.00
Scrap rails, random lgth	61.00		
Rerolling rails	67.00		69.00
Rails 2 ft and under	66.00		67.00
Locomotive tires, cut	57.00		
Cut bolsters & side frames	57.00		
Angles and splice bars	64.00		
RR. steel car axles	63.00		
RR. couplers and knuckles	57.00		
No. 1 machinery cast	53.00		
Cupola cast	53.00		
Heavy breakable cast	41.00		
Cast iron brake shoes	40.00		41.00
Cast iron car wheels	47.00	to	48.00
Malleable	60.00	to	
Stove plate	41.00	to	42.00
Steel car wheels	59.00		60.00

Philadelphia Area

i illiadelpilla Alea		
No. 1 hvy. melting	50.00 to	43.00
No. 2 bundles	39.00 to	
Mixed bor, short turn	35.00 t	0 36.00
Cast iron borings Shoveling turnings	35.50 to 38.00 t	
Clean cast chem. borings . Low phos. 5 ft and under .	41.00 to	
Low phos. 2 ft and under . Low phos. punch'gs	55.00 to	0 56 00
Elec. furnace bundles	52.00 t	0 53.00
RR. steel wheels	45.00 t	
RR. spring steel	58.00 t	
Cupola cast	48.00 t	0 50.00
Heavy breakable cast Cast iron car wheels	52.00 t 58.00 t	
Malleable Unstripped motor blocks	67.50 t	
No. 1 machinery cast	55.00 t	

Cleveland

No. 1 hvy. melting	52.50	to	\$53 50
No. 2 hvy. melting	47.00	to	48.00
No. 1 bundles	52.50	to	53.50
No. 2 bundles	40.00		
No. 1 busheling	52.50		
No. 1 busileting			
Machine shop turn	29.00		
Mixed bor, and turn.	33.00		
Shoveling turnings	33.00	to	. 34.00
Cast iron borings	33.00	to	34.00
Cut struct'r'l & plates, 2 ft			
& under	57.00	to	58.00
Drop forge flashings	52.50	to	53.50
Low phos. punch'gs, plate.	54.00	to	55.00
Foundry steel, 2 ft & under	56.00	to	57.00
No. 1 RR. heavy melting	52.00	to	53.00
Rails 2 ft and under	69.00	to	70.00
Rails 18 in. and under	70.00	to	71.00
Railroad grate bars	40.00	to	41.00
Steel axle turnings	34.00	to	35.00
Railroad cast	56.00	to	57.00
No. 1 machinery cast	55.00	to	56.00
Stove plate	51.00	to	52.00
Malleable	58.00	to	59.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting \$55.0	
No. 2 hvy. melting 45.0	
No. 1 bundles 55.0	00 to 56.00
No. 2 bundles 42.6	
Machine shop turn 29.0	
Shoveling turnings 34.6	
Cast iron borings 34.6	
Low phos. plate 57.6	00 to 58.00

Buffalo

No. 1 hvy. melting	45.00	to	\$46.06
No. 2 hvy. melting	37.00	to	38.00
No. 1 busheling	45.00	to	46.00
No. 1 bundles	45.00	to	46.06
No. 2 bundles	33.00	to	31.00
Machine shop turn	27.00	to	28.00
Mixed bor, and turn	28.00	to	29.06
Shoveling turnings	29.00	to	30.06
Cast iron borings	29.00	to	30.00
Low phos. plate	54.00	to	55.00
Scrap rails, random lgth	51.00	to	52.00
Rails 2 ft and under	65.00	to	66.00
RR. steel wheels	55.00	to	56.06
RR. spring steel	55.00	to	56.00
RR, couplers and knuckles	55.00	to	56.00
No. 1 machinery cast	52.00	to	53.00
No. 1 cupola cast	48.00	to	49.00

Detroit

Brokers buying prices per gro	ss ton.	on car	
No. 1 hvy. melting			
No. 2 hvy. melting			
No. 1 bundles, openhearth			00
No. 2 bundles	32.00	to 33.	00
New busheling	44.00	to 45.	00
Drop forge flashings	43.50	to 44.	50
Machine shop turn	20.00	to 21.	00
Mixed bor, and turn	23.00	to 24.	00
Shoveling turnings	23.00	to 24.	00
Cast iron borings	23.00	to 24.	00
Low phos. punch'gs, plate	45.00	to 46.	00
No. 1 cupola cast	44.00	to 45.	00
Heavy breakable cast	37.00	to 38.	00
Stove plate	38.00	to 39.	00
Automotive cast	48.00	to 49.	00

St. Louis

OIL EGGIS			
No. 1 hvy. melting	40.50	to	\$41.50
No. 2 hvy. melting	37.50	to	38.00
No. 1 bundles	42.50	to	43.50
No. 2 bundles	33.00	to	34.00
Machine shop turn	26.00	to	27.00
Cast iron borings	28.00	to	29.00
Shoveling turnings	28.00	to	
No. 1 RR. hvy. melting	52.00	to	53.00
Rails, random lengths	58.50		
Rails 18 in. and under	65.00	to	66.00
Locomotive tires uncut	53.00	to	54.00
Angles and splice bars	56.00	to	57.00
Std. steel car axles	59.00	to	60.00
RR. specialties	55.00		
Cupola cast	47.00		
Heavy breakable cast	38.50		
Cast iron brake shoes	38,50		
Stove plate	39.50		
Cast iron car wheels	50,00		
Rerolling rails	65.00		
Malleable	50.00		
Unstripped motor blocks	38.00		

Boston

Brokers buying prices per group	s ton, on cars:
No. 1 hvy. melting	41.00 to \$42.00
No. 2 hvy. melting	32.00 to 32.50
No. 1 bundles	41.00 to 42.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	41.00 to 42.00
Elec. furnace, 3 ft & under	42.50 to 43.50
Machine shop turn	24.00 to 24.50
Mixed bor, and short turn.	26.50 to 27.00
Shoveling turnings	28.00 to 28.50
Clean cast chem, borings .	29.00 to 30.00
No. 1 machinery cast	44.50 to 45.50
Mixed cupola cast	40.00 to 41.00
Heavy breakable cast	42.50 to 43.00
Stove plate	
Unstripped motor blocks .	26.00 to 26.50

New York

Brokers buying prices per gre	es ton, on cars:
No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	39.00 to 40.00
No. 2 bundles	32.00 to 33.00
Machine shop turn	23.00 to 24.00
Mixed bor, and turn	
Shoveling turnings	
Clean cast chem. borings .	
No. 1 machinery cast	
Mixed yard cast	
Charging box cast	
Heavy breakable cast	
Unstripped motor blocks	29.00 to 30.00

Birmingham

No. 1 hvy. melting	36.00	to	\$37.00
No. 2 hvy. melting	34.00	to	35.00
No. 1 bundles	36.00	to	37.00
No. 2 bundles	27.00	to	28.00
No. 1 busheling	36.00		37.00
Machine shop turn	26.00	to	27.00
Shoveling turnings	27.00		28.00
Cast iron borings	21.00	to	22.00
Electric furnace bundles .	44.00	to	45.00
Structural and plate, 2 ft .	49.00	to	50.00
Structural and plate, 2 ft .	50,00		51.00
No. 1 RR. hvy. melting	47.00	to	48 00
Scrap rails, random lgth	57.00	to	58.00
Rails, 18 in. and under	60.00		61.00
Angles & splice bars	57.00		
Rerolling rails	61.00		
No. 1 cupola cast.	47.50		48.50
Stove plate	46.00	to	47.00
Charging box cast	32.00		
Cast iron car wheels	37.00		
Unstripped motor blocks	37.00		
Mashed tin cans	15.00	to	16.00

Cincinnati

Brokers buying prices per gross ton, on cars: No. 1 hvy. melting	
No. 1 hvy. melting	48.00 to \$49.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	48.00 to 49.00
No. 2 bundles	37.00 to 38.00
Machine shop turn	31.00 to 32.00
	31.00 to 32.00
	33.00 to 34.00
Cast iron borings	
Low phos. 18 in. & under .	
Rails, random lengths	59.00 to 60.00
Rails, 18 in, and under	66.00 to 67.00
No. 1 cupola cast	46.00 to 47.00
Hvy. breakable cast	42.00 to 43.00
Drop broken cast.	

San Francisco

No. 1 hvy. melting	\$36.00
No. 2 hvy. melting	30.00
No. 1 bundles	35.00
No. 2 bundles	26.00
No. 3 bundles	20.00
Machine shop turn	18.00
Cast iron borings	20.00
No. 1 RR, hvy. melting	45,00
No. 1 cupola cast.	45.00
Las Annales	

Los Angeles

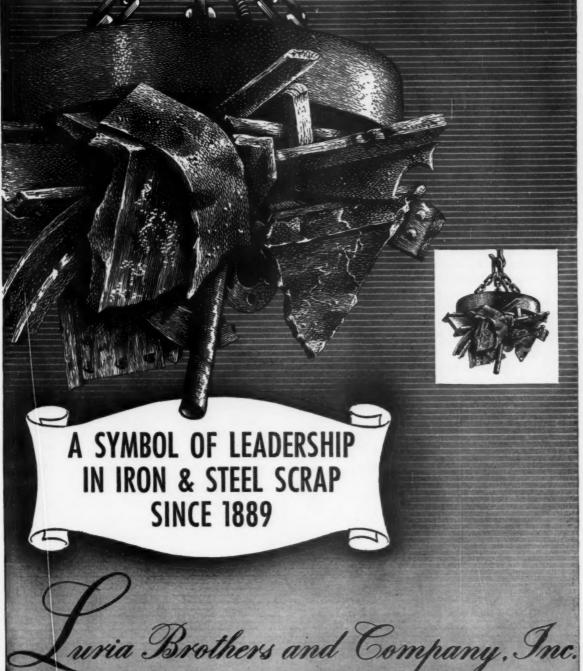
No. 1 hvy. melting	\$38.00
No. 2 hvy. melting	32.00
No. 1 bundles	37.00
No. 2 bundles	28.00
No. 3 bundles	22.00
Machine shop turn	18.00
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under	38.00
No. 1 RR. hvy. melting	44.00
No. 1 cupola cast	12.00

Seattle

No. 1 hvy. melting								J		\$38.00
No. 2 hvy. melting			*					*	×	35.00
No. 2 bundles										26.00
No. 3 bundles										20.00
No. 1 cupola cast.										45.00 45.00
Mixed yard cast.	×.	×	×	*	٠	•	•			40.00

Hamilton, Ont.

No. 1 hvy. melting	\$45.50
No. 2 hvy. melting	41.50
No. 1 bundles	45.50
No. 2 bundles	38.00
Mixed steel scrap	39.50
Bushelings	35.50
Mush., new fact., prep'd	43.50
Bush., new fact., unprep'd	39.50
Machine shop turn	18.00
Short steel turn	27.50
Mixed bor. and turn \$16.00 to	19.00
Rails, rerolling	53.50
Cost some 49 00 to	45 00



PHILADELPHIA NATIONAL BANK BLDG.

LEBANON, PENNA. DETROIT (ECORSE), READING, PENNA. MICHIGAN MODENA, PENNA. PITTSBURGH, PENNA. ERIE, PENNA.

BIRMINGHAM, ALA. HOUSTON, TEXAS PUEBLO, COLORADO BOSTON, MASS. LEBANON, PENNA. READING, PENNA. BUFFALO, N. Y. LOS ANGELES, CAL. ST. LOUIS, MO CHICAGO, ILLINOIS NEW YORK, N. Y. SAN FRANCISCO, CAL. CLEVELAND, OHIO PITTSBURGH, PA. SEATTLE, WASH. DETROIT, MICH. MONTREAL, CANADA

EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. Cable Address: FORENTRACO

Try For World Copper Price

Anaconda pegs copper from Chilean subsidiaries on London Metals Exchange . . . Considered possible attempt at world price . . . Kennecott expected to go along.

◆ A SINGLE world price for copper seems to be the goal of the latest price move by Anaconda. With the U. S. domestic price and the quotation of the London Metals Exchange differing from 6-13¢ per lb, it obviously would take a radical step to accomplish this. Anaconda's action is certainly unusual.

Effective the beginning of this week, copper emanating from Anaconda's Chilean subsidiary is pegged on the London Metals Exchange price.

Further qualification of this policy statement is expected later in the week.

Questions which remain to be answered include (1) What is the London price? There are two sessions of the LME, a so-called official session in the morning and one in the afternoon. Will the price be the closing sale, bid price, asked price or an average of the difference? (2) What is the exchange rate to be used? Official Bank of England \$2.80 or free exchange rate at New York? (3) What if any will be allowances for freight costs?

Thus far Kennecott has not yet gone along with the new policy. However, it seems likely the company will, since it is a minor voice in Chile, mining only about half as much Chilean copper as Anaconda. The idea almost certainly reflects the fine touch of Chilean diplomatic pressure. When Kennecott goes along, Chile will have achieved its objective—a single price for her copper in line with the higher European quotation.

Transitional is the word one industry representative used to describe the move. Since domestic copper is, at least for the present, holding at 46¢ per lb, it means that copper consumers would be paying a fixed price for 75 to 85 pct of producer's copper, and a fluctuating, higher price for the other 15 to 25 pet. A fabricator might wind up paying 10¢ per lb more than his competitor for copper-a disastrous situation in a competitive market. Or he might be able to buy mixed tonnages (Anaconda bars are marked CCC from Chile and NEC domestic) each time and establish a working average. If more copper is diverted to the U.S. from London by Chile because of the equality of return and the lure of the dollar, furious bidding on the short supply in London might drive the price up so that you would have the incongruous situation of more adequate domestic supply and a higher price.

Obviously, Anaconda doesn't expect this to happen or it never would have made the move. Another possibility is, since a great

deal of the copper mined now will go through established channel to established customers, contracts could be arranged to promote equitable distribution of the higher and lower priced copper. This might tend to close the gap between prices and eventually stabilize the market.

If the kinks can be worked out and pains taken to assure balanced deliveries, the move will amount to little more than a price increase with a sporting chance of solving the current copper shortage.

In an effort to keep consumers up-to-date, The Iron Age has added a line to its daily price table reflecting the London Metals Exchange price. It is an estimate based on the official rate of exchange for the pound sterling and the bid price for the official

ALUMINUM . . . Aluminum Co. of America pushed its net income for 1955 over 41 pct higher than 1954 for a record \$87.6 million. To do this Alcoa broke another company record by turning out over 1.4 billion lb of primary metal. Milestones during 1955 were introduction of colored aluminum mill products to the company's line, and the increase by the automakers in the use of aluminum.

TIN . . . Cancellation of planned strike, at least for the present, by the Malayan Mining Employees Union caused the tin market to ease up with the price dropping to about \$1.01 for spot tin. Agreement was reached with the representatives of the Malayan Mining Employers Assn on many of the points in question. Another meeting will be held on March 23rd to settle the remaining differences. It is suspected that the government had something to do with the strike cancellation. Rumors suggest the possibility that the government would have taken definite action against a strike while there was any possibility of negotiation remaining.

LEAD . . . The domestic market remained spotty with little trading in contrast to the London Market which was unusually active. Total domestic sales for February were down from the previous month reflecting partially the easing in demand.

The 64th annual report of National Lead Co. indicated that the company had a very successful year in 1955 with a net income of \$47,889,941.

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Mar. 14	Mar. 15	Mar. 16	Mar. 17	Mar. 19	Mar. 20
Copper, electro, Conn.	46.00	46.00	46.00		46.00	46.00
Copper, Lake, delivered	46.00	46.00	46.00		46.00	46.00
Copper, Anaconda-Chilean					60.62*	58.24*
Tin, Straits, New York	101.875	102.25	101.25		100.875	100.50
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

Note: Quotations are going prices.

Free-Cutting CHASE BRASS ROD

makes tools last longer, lowers production costs!

The big difference in machining Chase Free-Cutting Brass Rod is a direct result of just the *right* amount of evenly dispersed lead particles in the alloy. The proof is in the chips!

Chase Free-Cutting Brass Rod yields short, brittle chips which rapidly clear cutting tools — make possible heavier feeds, higher cutting speeds—without gumming or jamming.

You can get Chase copper alloys in many different cross sections that save additional machining time. These include round, hexagonal and octagonal rods, square and rectangular bars, and oval, half oval and half round shapes. Remember, too, repeat orders of Chase alloys always have the same cutting characteristics.

Get the alloy rod you need, from Chase wholesalers or from Chase's own fully stocked warehouses or mills. Write, wire or phone, today!

Chase &

BRASS & COPPER CO.
WATERBURY 20, CONNECTICUT - SUBSIDIARY OF KENNECOTT COPPER CORPORATION

NEW CHASE ROD and WIRE MOVIE "IN THE CHIPS"

Contact your nearest Chase Warehouse or Sales Office now to arrange for a loan of this informative film for showing in your own organization. Write on your Company letterhead.

The Nation's Headquarters for Brass & Copper (tmin effic only)

Atlanta Chicago Baltimora Ginciana Beston Clevelan Charletts† Dallas 31. Denver India Detroit Kans Grand Rapids† Los / Reuston Miller San Francisco

Minneapolis Nowark New Orleans New York Walerbury Philadelphia Pittaburgh Providence Rucinsstar†

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate ("F" temper except 6061-0)

Alloy	.032	.081	.136-	. 250- 8.	
1100, 3003	40.8	38.7	87.5	86.5	
5052	48.3	43.4	41.7	89.9	
6061-0	45.4	41.2	89.4	89.8	

Extruded Solid Shapes

Factor								6068 T-5	6062 T-4							
6- 8.															41.6-48.8	56.6-60.3
18-14.	*	,	,	*	×	*	×	*	*	*	*	×	*		42.8-48.7	57.5-61.8
94-26. 86-88.	*	*			×	*	*	*		٠	*	*	*		45.8-45.7	67.7-72.1 90.5-94.8
eu-05.	*		*	*			*	*	*	*	*	10	*	*	00.0-06.3	90.0-98.8

Screw Machine Stock-2011-T-3

Sise*	lise* 34		%-1	114-114
Price	54.5	53.4	83.1	50.1

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length* →	72	98	120	144	
.019 gage	\$1.295	\$1.727	\$2.160	\$2.590	
.024 gage	1.615	2.162	2.693	8.282	

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed) Sheet and Plate

Type ↓ Gage →	. 250 - 3.00	, 250 - 2.00	.195	.084	.081	
AZ31A Stand. Grade		61	68.5	78	99	
AZ31A Spec.		79	88	100	148	
Tread Plate	64		68			
Teoling Plate	05					

Extruded Shapes

1º	sh			
diam.	0.8	1.0	4.0	W. tubing
61.50	65.4- 72.4	61.9-67.8	57.7- 63.3	76.8
73	78.9- -83.9	78.4- 78.8	69.2- 73.7	80
	diam.	1° diam. rod . 0.8 61.80 65.4-72.4	1° diam. rod . 0.8 1.0 61.50 65.4 61.9 67.8	diam. rod . 0.8 1.0 4.0 61.80 65.4 67.3 62.2 73 76.9 78.4 69.9

Alloy Ingot

AZ63	B (Die C A, AZ92	Ating)	(Band C	Darting)	31 36	(delivered) (Velasco, Tex.

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

"A" Nickel	Monel	Incone
Sheet, CR 102	83	99
Strip, CR 102	92	125
Rod, Bar, HR 87	74	93
Angles, HR 87	74	93
Plate, HR 97	87	95
Seamless tube. 122	110	153
Whot, Blocks	71	***

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	70.63			70.32
Brass, 70/30	57.60	58.14	******	60.51
Brass, Low	62.55	63.09	62.49	65.36
Brass, R L	64.34	64.88	64.28	67.15
Brass, Naval	60.70	65.96	55.01	63.86
Munts Metal	58.74	52.75	54.55	
Comm. Bs.	66.68	67.22	66.62	69.24
Mang. Bz.	64.44	67.09	58.54	
Phos. Bz. 5%	88.22	85.87	88.72	

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, \$13.10-\$13.60; alloy \$15.25-\$15.76; Plate, HR, commercially pure, \$10.50-\$11.00; alloy, \$11.50-\$12.00. Wire, rolled and/or drawn, commercially pure, \$9.50-\$11.50; alloy, \$11.50; Bar, HR or forged, commercially pure, \$7.90-\$8.15; alloy, \$7.90-\$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)
Aluminum ingot, 99+%, 10,000 lb.
freight allowed 24.40
Aluminum pig 22.50
Antimony, American, Laredo, Tex. 33.56
Beryllium copper, per lb conta'd Be. \$43.00
Beryllium aluminum 5% Be, Dollars
per lb contained Be\$72.76
Bismuth, ton lots\$ 2.26
Cadmium, del'd \$ 1.70
Cobalt, 97-99% (per lb)\$2.60 to \$2.69
Copper, electro, Conn. Valley 46.00
Copper, Lake, delivered 46.00
Gold, U. S. Treas., per troy oz \$35.00
Indium, 99.9% dollars per troy oz \$ 2.2
Iridium, dollars per troy oz \$100 to \$120
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Velasco,
Tex., 10,000 lb, pig 32.5
ingot

Tex., 10,000 lb, pig	32.5
ingot	00.2
Magnesium, sticks, 100 to 500 lb.	53.0
Mercury dollars per 76-lb flask,	
f.o.b. New York\$258 to	\$26
Nickel electro	
Nickel oxide sinter at Copper	
Cliff, Ont., contained nickel	60.7
Palladium, dollars per troy oz. \$23 t	0 \$2
Platinum, dollars per troy oz \$97 to	\$10
Cilliana Ny and Ny ale	

Palladium, dollars per troy oz. \$23 to \$24
Platinum, dollars per troy oz. \$97 to \$107 Silver, New York, cents per troy oz. 91.125
Tin, New York\$100.50*
Titanium sponge, grade A-1 \$3.15 to \$3.45
Zinc, East St. Louis
Zirconium, sponge\$10.00

REMELTED METALS

Brass Ingot

	(0	enta	9	e	7	1	b		d	6	24	iq	16	7	6	d	,	-	01	a 1	ri	lo	a	d8)
88	-5-5	-5 in	g	01	t																				
	No.		-		0					0						0	0								44.00
	No.							0				0													43.00
	No.				0	0			۰								0								42.00
8(-10-	10 in	g	0	٤																				
	No.	305	٦.			0																			47.75
	No.	315																							46.00
88	3-10-	2 ins																							
	No.	210																							60.75
	No.	215																							56.76
	No.	245																							50.75
Y	ellov	v ing	0	ŧ																-					
_		405																							34.75
M		anese												1	1		•				•				
		421																							39.21

Aluminum Inget (Cents per lb del'd 30,000 lb and over) 95-5 aluminum-silicon alloys

0.30	copper	max	 . 30.50-31.50
0.60	copper	max	 . 30.25-31.25
			.31.50-32.50
			29.00-29.75
			. 29.00-29.50
195 all	OY		 30.50-31.25
			. 30.50-31.25
			29.00-29.50

Steel deaxidizing aluminum, notch bar

	grama	-	13		4		۰	48	-	*	
Grade	1-95-971/	%									.29.00-30.00
Grade	2-92-95%										.28.00-29.00
Grade	3-90-92%		×		*				*		.27.50-28.50
Grade	4-85-90%				×				*		.27.00-28.00

SCRAP METALS

Brass Mill Scrap	
(Cents per pound, add 1¢	per lb for
shipments of 20,000 lb as	nd over)
Heavy	Turning
Copper 42	41%
Yellow brass 31 %	29
Red brass 37	3634
Comm. bronze 381/4	37%
Mang, bronze 29 1/4	28 1/2
Yellow brass rod ends 31	

Custom Smelters Scrap

Cents per pound carload lots, to refinery)	
No. 1 copper wire	46 1/2
No. 2 copper wire Light copper	4234
*Refinery brass	41
• Dry copper content.	

Ingot Makers Scrap (Cents per pound carload lots, delivered

to refinery)	
No. 1 copper wire	461/4
No. 2 copper wire	45
Light copper	421/2
No. 1 composition	36 32
No. 1 comp. turnings Hvy. yellow brass solids	27
Brass pipe	28
Radiators	28 %
Aluminum	
Mixed old cast 1	914-2014

Mixed old cashs 1972-2074 Mixed new clips 2074-2174 Mixed turnings, dry 20 -21 Dealers' Scrap (Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire.	4344
No. 2 heavy copper and wire.	41 -41%
Light copper	39 -39 1/4
New type shell cuttings	381/2-39
Auto radiators (unsweated)	
No. 1 composition	331/2-34
No. 1 composition turnings	31 -31 1/2
Unlined red car boxes	26 -26 1/2
Cocks and faucets	27 -28
Clean heavy yellow brass	22 -23
Brass pipe	27 -28
New soft brass clippings	28 28 1/4
No. 1 brass rod turnings	26 -26 14

Aluminum Alum. pistons and struts . 17 Aluminum crankcases . 16 1100 (28) aluminum clippings 19 Old sheet and utensils . 16 Borings and turnings . 11 Industrial castings . 16 2024 (248) clippings . 18

Zinc

Old die cent wermp	- 12
Nickel and Monel	
Pure nickel clippings	\$1.5
Clean nickel turnings	\$1.30
Nickel anodes	\$1.59
Nickel rod ends	\$1.50
New Monel clippings	50
Clean Monel turnings	56
Old sheet Monel	25
Nickel silver turnings, mixed.	21

Soft scrap lead 12 ½ Battery plates (dry) 7 Batteries, acid free

Miscellaneous Block tin 84 -

No. 1 pewter	90 91
Auto babbitt	4314-444
Mixed common babbitt	15%
Solder joints	20 -204
Siphon tops	50
Small foundry type	16%-16%
Monotype	1514-16
Lino. and stereotype	141/2-15
Electrotype	
Hand picked type shells	1014-11
Lino. and stereo. dross	5% 6
Electro. dross	4%- 5

	STEEL		rs, BLO	OMS,	PIL-		SHAPES							
P	RICES		SLABS		ING	STR	UCTUR	ALS		-	STRI	P		
Ma	(Effective arch 20, 1956)	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carben Wide- Flange	Het- relled	Cold- rolled	HI Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- relied	Alloy Cald- relied
1	Bethlebers, Pa.			\$96.00 B3		4.45 B3	6.80 B3	4.65 B3						
-	Buffalo, N. T.	\$68.50 B3	\$84.50 R3, B3	\$96.00 R3, B3	5.45 B3	4.45 B3	6.80 B3	4.65 B3	4.325 R3,B3	6.25 R7,510	6.425 B3	9.10 B3		
-	Clayment, Del.													4
1	Harrison, N. J.													13.45 CI
1	Conshohocken, Pa.								4.375 A2	6.30 .42	6.425 A2		(4.0)	
1	New Bedford, Mass.									6.70 Rs				
3	Johnstown, Pa.	\$68.50 B3	\$84.50 B3	\$96.00 B3		4.65 B3	6.80 B3						1	
5	Boston, Mass.									6.80 78			44	13.80 78
1	New Haven, Conn.									6.70 DI AS				
1	Phoenixville, Pa.					5.15 P2		5.15 P2						
	Sparrows Pt., Md.								4.325 B)	6.25 B9	6.425 B3	9.10 B3		
	Bridgeport, Wallingford, Com.	\$73.50 N8	\$89.50 N8						4.625 NB	6.78 IV1			7.50 N8	
1	Pawtucket, R. I. Worcester, Mass.									6.80 N7 A3				13.80 N7
	Alten, III.								4.50 L1					
	Ashland, Ky.								4.325 /47					
	Canton-Massillon,		\$86.50 R3	\$96.00 R3					-					13.45 G4
	Dover, Ohio												n an 1879	10.45.79
	Chicago, III.	\$68.50 UI	\$84.50 R3, U1,W8	\$96.00 R3, UI,W8	5.45 UI	4.60 UI, W8	6.75 UI, YI	4.60 U1	4.55 AI 4.325 N4,W1	4.35 A1,78			7.20 W/8	13.45 71
	Cleveland, Ohio									6.25 A5,J3		9.30 /15		13.45 A
	Detroit, Mich.			\$96.00 R5					4.425 G3,M3	6.35 DI,D2 G3,M2,PI	6.525 G3	9.29 D2, G3		
	Duluth, Minn.													
WEST	Gary, Ind. Harbor, Indiana	\$68.50 UI	\$84.50 UI	\$96.00 UI, YI	5.45 /3	4.60 UI, 13	6.75 UI, 13		4.325 /3, UI, YI	6.35 /5 6.25 Y/	6.425 /3, UI, YI	9.30 Y/	7.20 YI, UI	
DIE	Sterling, III.				-	-			4.425 N4	-				
MIDDLE	Indianapolis, Ind.				-		-		-	8.40 CF				
-	Newport, Ky.				-								7.20 N5	
	Middletawn, Ohio									6.45 A7				
	Niles, Warren, Ohio Sharon, Pa.	\$68.50 C/0	\$84.50 C10	\$96.00 C/0					4.325 SI, R3	8.28 SI, R3,74	6.425 SI, R3	9.10 SI, R3	7.20 SI	13.45 S
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$68.50 UI, J3	\$84.50 J3, UI,CII	\$96.00 UI, CII	5.45 UI	4.60 UI, J3	6.75 UI, J3	4.80 UI	4.325 Pd	1.21 37,84			7.20 59	13.45 .5
	Pertamouth, Ohio													
	Weirton, Wheeling, Follanaboe, W. Va.					4.60 W3			4.325 W3	8.28 F3,W3	6.425 IV3	9.10 W3		
	Youngstown, Ohio		\$84.50 C/0	\$96.00 YI.			6.75 YI		4.325 UI, YI	6.28 YI,C3	6.425 UI. YI	9.30 YI	7.29 UI, YI	13.45 C
_	Feotana, Cal.	78.00 K1	94.00 K1	117.00 K/		5.30 K1	7.40 KI	5 45 K1	5.125 <i>K1</i>	8.00 K/	7.575 K1		8.95 KI	
	Geneva, Utah		\$84.50 C7			4.60 C7	6.75 C7							
	Kansas City, Me.					4.70 S2	6.85 S2				6.675 S2		7.45 52	
II	Los Angeles, Terrance, Cal.		\$94.90 B2	\$116.00 B	2	5.30 C7, B2	7.45 B2	+	8.875 C7, 82	8.39 C/	-		8.40 B2	
WEST	Minneque, Cole.					4.90 C6			5.425 Cs					
	Portland, Ore.					5.35 02								
	San Francisco, Niles Pittsburg, Cal.	la la	\$94,00 B2			5.25 B2, pg	7.40 B2		E.878 B3, C7					
	Seattle, Wash.		\$98.00 B2			5.35 B2	7.50 B2		6.325 B3	-				5
-	Atlanta, Ga.								4.525, 48					
SOUTH		\$68.50 TZ	\$84.50 TZ			5.10 C/6 4.60 R3, 7	6.75 72		4.325 RJ, 1 4.825 C/6	70	6.425 77			
30	Houston, Lone Star,	\$74.50 L3	\$89.50 .52	\$101.00 S	2	4.70 S2	6.85 S2				6.675 SI		7.46 S2	

-	RICES				SH	EETS					WIRE	TINPL	ATE†	BLACK
	(Effective rch 20, 1956)	Hot-relled /8 ga. & bvyr.	Cold- relied	Calvanted 18 gs.	Enamel- ing 12 ga.	Long Torne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 19 ga.		Cokes* 1.25-lb, base bex	Electro* #.25-lb. base box	Hollowars Enameling 29 ga.
	Sethlohem, Pa.													
-	Buffalo, N. Y.	4.325 B3	5.325 83				6.375 B3	7.875 B3			5.375 W6	† Special contarne deduct	ted mfg. 50¢ from	
1	Clayment, Del.											1 75.Ib. cake	base bar	
1	Contesville, Pa.											price. Can-ma blackplate 55 deduct \$2.20	to 128 lb. from 1.25-lb.	
1	Conshoheckon, Pa.	4.375 A2	5.375 A2				6.425 A2					* COKES:		
	Harrisburg, Pa.											edd 25¢. ELECTRO:	0.50-lb. add	
-	Hartford, Conn.											25¢; 0.75-16.	1.00. Differ-	
9	Johnstown, Pa.										5.375 B3	antial 1.00 lb add 65¢.	./0.25 lb.	
-	Fairless, Pa.	4.375 UI	5.375 UI				6.425 UI	7.925 UI				\$9.30 UI	\$8.00 UI	
1	New Haven, Cenn.													
1	Phoenixville, Pa.													
ľ	Sparrows Pt., Md.	4.325 B3	5.325 B3	5.85 B3			6.375 B3	7.875 B3	8.60 B3		5.475 B3	29,30 B3	\$8.00 B3	
1	Worcaster, Mass.								-		5.675 A5	-		
1	Trenten, N. J.	-												-
	Alten, III.		-						_		5.55 L1			1
1	Ashland, Ky.	4.325 A7	-	5.85 A7	5.90 .47						3.50 E1			-
	Canton-Massillon, Dever, Ohio		-	5.85 R1,	230 20	-								-
	Chicago, Jeliet, Ill.	4.55 Al	-	R3	-		6.375 UI		-		5.375 N4			-
		4.325 W8									5.375.A5,R			
	Sterling, Ill.										5.475 N4			
	Cleveland, Ohio	4.325 J3, R3	5.325 J3, R3		5.90 R3		6.375 J3, R3	7.875 J3, R3			5.375 A5			
	Detroit, Mich.	4.425 G3, M7	5.425 G3 5.325 M2				6.475 G3	7.975 G3						
	Newport, Ky.	4.325 N5	8.325 N5	5.85 N5	-	-	-	-	_	-			-	
E WEST	Gary, Ind. Harbor, Indiana	4.325 /3, UI, YI	5.325 /3, UI, YI	6.85 UI., 13	8.90 UI. 13	6.25 UI	6.375 YI. UI,I3	7.875 UI, YI			5.375 YI	\$9.20 I3, UI, YI	\$7.90 I3, UI, YI	6.65 UI
MIDDLE	Granite City, III.	4.525 GZ	5.525 G2	6.85 G2	6.10 GZ	-	-	-	-	-			\$8.00 GZ	6.75 G
Ī	Kokomo, Ind.		-	5.95 C9	-	-	-	-	-	-	5.475 C9	-	1	_
	Mansfield, Ohio	4.325 E2	5.325 E2	-	-	6.25 E2		-	-	E2	-	-		
	Middletown, Ohio		5.325 A7	5.85 A7	5.90 A7	6.25 A7	-	-	-	-	-	-	-	
	Nilas, Warren, Ohi Sharen, Pa.	4.325 SI, R3,N3	_	5.85 R3 6.85 N3	5.90 N3	6.25 N3	6.375 SI,	7.875 R3	_			\$9.20 R3	\$7.90 R3	
	Pittaburgh, Pa. Midland, Pa. Butler, Pa.	4.325 /3, UI,P6		5.85 UI	5.90 UI,		6.375 J3, UI	7.875 UI	8.60 UI		5.025 P6 5.375 A5	\$9.20 J3, UI	\$7.90 J3,	6.65 U
	Pertamenth, Ohio	4.325 P7	5.325 P7								5.375 P7			
	Weirton, Wheeling Fellansbee, W. V.	4.325 W		8.85 W3, W5		6.25 W3, W5	6.375 W3	7.875 W3				\$9.20 W3,	\$7.90 W3	6.65 F
	Youngstown, Ohio				5.90 Y/	-	6.375 UI.	7.875 Y/	-		5.375 Y/		-	-
_	Fontana, Cal.	5.125 K1	6.525 KI	-	-	-	7.175 K1	9.075 K1	-	-	-	-	-	-
	Geneva, Utah	4.425 C7												
	Kansas City, Mo.										5.625 S2			
WEST	Los Angeles, Torrance, Cal.										6.175 B2			
-	Minnsqua, Cale.										5.625 <i>C</i> 6			
	San Francisco, Nil Pittaburg, Cal.	es, 5.825 C7	6.275 C7	6.60 C7							5.675 C7	\$9.95 C7	\$8.65 C7	
	Seattle, Wash.													
-	Atlanta, Ga.													
SOUTH	Fairfield, Ala. Alabama City, Ala	4.325 R	5.325 77	8.85 R3, 77			6.375 TZ			5.625 R3	5.825 R3	\$9.30 72	\$8.00 72	

S	TEEL	,,	lelics identify p	roducers listed i	n key at end of	table. Hese p	rices, I.a.b. mil	l, la centa per là	, union other	rwise noted. E	ztras apply.	
P	RICES			BAF	es				PLA	TES		WIRE
	(Effective rch 20, 1956)	Carbon Merchant	Reinforc- ing	Cald Finished	Alloy Hot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Allay	Hi Str. Low Alloy	Mfr's. Bright
1	Bothlohem, Pa.				5.575 B3	7.425 B3	6.80 B3					
1	Buffalo, N. Y.	4.45 B3,R3	4.65 B3,R3	6.30 B5	5.575 B3,R3	7.425 B3,B5	6.80 B3	4.50 B3,R3				6.60 W6
1	Clayment, Del.					-		LID CI		6.30 C/	6.725 C4	
1	Ceatesville, Pa.							4.80 LI		6.30 L4	6.725 L4	
1	Conshehocken, Pa.							4.50 A2	8.575 A2		6.725 A2	
1	Harrisburg, Pa.							8.19 P2	S.STS C3			
-	Hartford, Conn.			6.40 R3		7.725 R3						
	Johnstown, Pa.	4.45 B3	4.65 B3		5.575 B3		6.80 B3	4.50 83		6.30 B3	6.725 B3	6.60 B3
w -	Fairless, Pa.	4.80 UI	4.80 UI		5.725 U1							
-	Newark, N. J.			6.70 W/IO		7.60 W10						
1-	Camdon, N. J.			6.78 P10								
	Bridgeport, Putnam, Conn.	4.80 N8		6.80 W/I	5.725 N8			4.750 NB				
1	Sparrows Pt., Md.		4.65 B3					4.50 83		6.30 B3	6.725 B3	6.70 B3
	Palmer, Wercester, Readville, Mass. Milton, Pa.	4.80 M7	4.80 M7	6.70 W11 6.45 C14 6.70 B5		7.725 A5,B5		4.50 R3				6.90 A5 6.90 W6
1	Spring City, Pa.			6.35 K4		7.60 K+						
	Alten, III.	4.85 <i>L1</i>										6,775 LI
	Ashland, Newport, Ky.							4.50 AT,N5		6.30 N5		
	Canton-Massillon, Manafield, Ohio	4.75 R3		6.25 R2,R3	5.575 R3,T5	7.425 R2,R3, T5		4.50 EI				
	Chicago, Jeliet, Ill.	4.65 UI, N4,W8,R3, 5.15 P13	4.65 N4,R3, 5.15 P13	6.25 B5,W8, W10,A5,L2	5.575 U1,R3, W8	7.425 A5,W8, W10,L2,B5		4.50 U1,W8, 13,R3 4.725 A1	8.575 UI	6.30 UI	6.725 UI	6.68 A5,I N4,W7
	Cleveland, Ohio	4.65 R3	4.65 R3	6.25 A5, C13		7.425 A5,C13	6.80 R3	4.00 J3,R3	8.578 <i>]</i> 3		6.72S R3, J3	6.60 A5, C13
+	Detroit, Mich.	4.75 G3	4.75 G3	5.90 <i>R5</i> 6.45 <i>B5</i> 6.15 <i>P3</i> 6.10 <i>P8</i>	5.575 R5 5.675 G3	7.425 R5 7.625 B5,P3, P8	6.90 G3	186			8.825 G1	
WEST	Duluth, Minn.											6.60 A5
MIDDLE	Gary, Ind. Harber, Crawferdsville Granite City, III.	4.65 <i>13, U1,</i> <i>Y1</i>	4.65 13, UI, YI	6.25 M5,R3	\$.575 <i>13, UI</i>	7.425 M5, R3	6.80 U1,13, Y1	4.50 I3, UI,YI	8,575 /3	6.30 U1, Y1	6.725 UI, 13, YI	6.35 M4
2	Kokomo, Ind.				-	-	-	£19 G1	-		-	6.79 C9
*	Sterling, III.	4.75 N4	4 75 N4					-	-		-	6,70 N4
	Niles, Warren, Ohio	-	412744	6.25 C/O	5.575 C/0	7.425 C10	6.80 R3	6.50 S1,R3	-	6.30 51	6.725 SI	6.10 111
	Sharen, Pa.	4.63 10,010		*25 C/6	3.313 C10	1.423 0.70	6.89 10	Car St, NO		4.34 37	6.123.57	
	Pittsburgh, Pa. Midland, Pa.	4.45 J3, UI, CII	4.65 J3, UI	6.25 A5,C8, C11,J3, W10,B4,R3	5.575 UI,CI	7.425 A5,C1 W10,C8,R3	6.80 J3, UI	4.50 J3, U1	5 575 UI	6.30 UI	6.725 J3, U	6.60 AS, P6
	Pertamouth, Ohio											4.60 P7
	Weirten, Wheeling, Fellanebee, W. Va.		4 07 214 377					4.50 W3,W3			497.96	8.50 W.
	Youngstown, Ohio	4.65 UI, YI, CIO, R3	4.65 UI, YI,	6.25 YI, UI	\$.575 UI, YI	7.425 YI,CI	6.80 UI, YI	4.50 UI, YI,		6.30 Y/	6.725 YI	6,60 YI
Г	Emeryville, Cal.	5.40 J5	5.40 J5									
	Fentana, Cal.	5.35 KI	5.35 KI		6.625 K1		7.50 KI	5. 20 KI		7.00 K1	7.375 KI	
	Geneva, Utah							4.50 C7			6.725 C7	
	Kansas City, Me.	4.90 52	4.90 SZ		5.825 S2		7.05 S2					6.85 52
15	Los Angeles, Torrance, Cal.	5.35 B2,C7	5.35 B2,C7	7.35 R3	6.625 B2		7.50 B2				7.625 B2	7.55 B2
WEST	Minnequa, Colo.	5.10 C6	5.10 C6					5.35 C6				6.85 C6
	Pertland, Ore.	5.40 02	5.40 02									
	San Francisco, Niles Pittaburg, Cal.	5.35 C7 5.40 B2,P9	5.35 C7 5.40 B2,P9				7.55 82					7.20 C7 7.55 C6
	Seattle, Wash.	5.49 B2,P12 N6	5.40 B2,P1	2			7.55 B2	5.40 B2		7.29 B2	7.825 B2	
-	Atlanta, Ga.	4.85 .48	4.85 A8									6.80 AB
SOUTH	Fairfield, Ala. City, Birmingham, Ala.	4.65 T2,R3 5.15 C/6					6.90 77	4.50 TZ,R3			6.725 77	6.60 R3, 77
1 00	Houston, Ft. Worth Lone Star, Tex.	4.90 52	4.90 S2		5.825 S2		7.05.52	4.85 L3 4.60 S2		6.40 52	6.825 37	6.85 52

Steel Prices (Effective March 20, 1956)

Key to Steel Producers

With Principal Offices

Al Acme Steel Co., Chicago
Al Alan Wood Steel Co., Conshehecken, Pa.

81 Babcock & Wilcox Tube Div., Beaver Falls, Pa

B2 Bethlehem Pacific Coast Steef Corp., San Francisco

#1 Bethlehem Steel Co., Bethiehem, Pa. B# Blair Strip Steel Co., New Castle, Pa.

85 Bliss & Laughlin, Inc., Harvey, Ill.

63 Bliss & Laughlin, Inc., Harvey, III.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles

C? Carpenter Steel Co., Reading, Pa.

C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymone, Del.
C5 Cold Metal Products Co., Youngstown, O.

C6 Colorado Fuel & Iron Corp., Denver

C6 Colorado Fuel & Iron Corp., Deuver C7 Columbia Geneva Steel Div., San Francisco C8 Columbia Steel & Shafting Co., Pittaburgh Continental Steel Corp., Kokomo, Ind.

C10 Copperweld Steel Co., Pittsburgh, Pa.

CII Coucible Steel Co. of America, Pittaburgh
CII Cumberland Steel Co., Cumberland, Md.

C13 Cuyahoga Steel & Wire Co., Cleveland

C/4 Compressed Steel Shafting Co., Readville, Mass N3 Niles Rolling Mill Div., Niles, O.

C15 G. O. Carlson, Inc., Thorndale, Pa. C/6 Conners Steel Div., Birmingham

C17 Chester Blast Furnace, Inc., Chester, Pa.

B1 Detroit Steel Corp., Detroit

D2 Detroit Tube & Steel Div., Detroit D3 Driver Harris Co., Harrison, N. J.

D4 Dickson Weatherproof Nail Co., Evansten, Ill

D5 Henry Disston & Sons, Inc., Philadelphia

El Eastern Stainless Steel Corp., Baltimore

E2 Empire Steel Co., Manafield, O.

F/ Firth Sterling, Inc., McKeesport, Pa.

F2 Fitzsimmons Steel Corp., Youngstown

F3 Foliansbee Steel Corp., Foliansbee, W. Va

GI Globe Iron Co., Jackson, O.

G7 Granite City Steel Co., Granite City, Ill.

G3 Great Lakes Steel Corp., Detroit. G4 Greer Steel Co., Dover, O.

HI Hanna Furnace Corp., Detroit

Al Alan Wood Steel Co., Conshehocken, Pa.

Al Allegheny Ludlum Steel Corp., Pittsburgh

Al American Cladmetals Co., Carnegie, Pa.

Al American Steel & Wire Div., Cleveland

A American Steel & Wire Div., Cleveland

A American Steel Corp., Middletown, O.

All Atlantic Steel Corp., Middletown, O.

All Atlantic Steel Corp., Atlanta, Ga.

All Atlantic Steel Corp., Washington, Pa.

Jones & Laughlin Steel Corp. J1 Jackson Iron & Steel Co., Jackson, O.

Jessop Steel Corp., Washington, Pa.
 Jones & Laughlin Steel Corp., Pittsburgh

J4 Joslyn Mfg. & Supply Co., Chicago J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria

K3 Koppers Co., Granite City, Ill.

Ké Keystone Drawn Steel Co., Spring City, Pa

L! Laclede Steel Co., St. Louis L2 La Salle Steel Co., Chicago

Lukens Steel Co., Coatesville, Pa. MI Mahoning Valley Steel Co., Niles, O.

M3 Mercer Tube & Mfg. Co., Sharon, Pa.

M4 Mid-States Steel & Wire Co., Crawfordsville, Ind

M5 Monarch Steel Div., Hammond, Ind.

M6 Mystic Iron Works, Everett, Mass.

M7 Milton Steel Products Div., Milton, Pa.

Ni National Supply Co., Pittsburgh

N2 National Tube Div., Pittsburgh

N4 Northwestern Steel & Wire Co., Sterling, 18.

N5 Newport Steel Corp., Newport, Ky.

N6 Northwest Steel Rolling Mills, Seattle

N7 Newman Crosby Steel Co., Pawticket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.
01 Oliver Jone 5 Co., Co.

01 Oliver Iron & Steel Co., Pittsburgh 02 Oregon Steel Mills, Portland

PI Page Steel & Wire Div., Monessen, Pa.

P2 Phoenix Iron & Steel Co., Phoenixville, Pa.

P3 Pilgrim Drawn Steel Div., Plymouth, Mich.

P4 Pittsburgh Coke & Chemical Co., Pittsburgh

P5 Pittsburgh Screw & Bolt Co., Pittsburgh P6 Pittaburgh Steel Co., Pittaburgh

P7 Portsmouth Div., Detroit Steel Corp., Detroit

P8 Plymouth Steel Co., Detroit

P9 Pacific States Stee ICo., Niles, Cal.

P10 Precision Drawn Steel Co., Camden, N. J. P11 Production Steel Strip Corp., Detroit

P12 Pacific Steel Rolling Mills, Seattle

P13 Phoenix Mfg. Co., Joliet, Ill.

RI Reeves Steel & Mig. Co., Dover, O.

R2 Reliance Div., Eaton Mfg. Co., Massillon, O

R3 Republic Steel Corp., Cleveland

R4 Roebling Sons Co., John A., Trenten, N. J.

R5 Rotary Electric Steel Co., Detroit R6 Rodney Metals, Inc., New Bedford, Mass.

R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.S2 Sheffield Steel Corp., Kansas City

53 Shenango Furnace Co., Pittsburgh

S# Simonds Saw and Steel Co., Fitchburg, Mass

55 Sweet's Steel Co., Williamsport, Pa.

S6 Standard Forging Corp., Chicago S7 Stanley Works, New Britain, Conn.

S8 Superior Drawn Steel Co., Monaca, Pa.

59 Superior Steel Corp., Carnegie, Pa.

S10 Seneca Steel Service, Buffalo

71 Tonawanda Iron Div., N. Tonawanda, N. Y.

72 Tennessee Coal & Iron Div., Fairfield
73 Tennessee Products & Chem. Corp., Nashville

Thomas Strip Div., Warren, O.
 Timken Stoel & Tube Div., Canton, O.

76 Tremont Nail Co., Wareham, Mass.

77 Texas Steel Co., Forth Worth 78 Thompson Wire Co., Boston

UI United States Steel Corp., Pittsburgh

U2 Universal-Cyclopa Steel Corp., Bridgevilla, Pa

U3 Ulbrich Stainless Steels, Wallingford, Cam.
U4 U. S. Pipe & Foundry Co., Birmingham

WI Wallingford Steel Co., Wallingford, Conn

W2 Washington Steel Corp., Washington, Pa. W3 Weirton Steel Co., Weirton, W. Va.

W4 Wheatland Tube Co., Wheatland, Pa.

W5 Wheeling Steel Corp., Wheeling, W. Va.

W6 Wickwire Spencer Steel Div., Buffale

W7 Wilson Steel & Wire Co., Chicago

W8 Wisconsin Steel Co., S. Chicago, Ill. W9 Woodward Iron Co., Woodward, Ala.

W10 Wyckoff Steel Co., Pittsburgh

W11 Worcester Pressed Steel Co., Worcester, Mass.

W12 Wallace Barnes Steel Div., Bristol, Conn. YI Youngstown Sheet & Tube Co., Youngstown, U.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about \$200 per not ton

							BUTT	WELD										SEAN	ILESS			
	1/2	In.	%	ln.	11	n.	11/4	In.	11/2	in.	2	in.	21/2	In.	2	ln.	21/	lo.	3	In.	31/4	4 lo
STANDARD T. & C.	Bik.	Gal.	Blk.	Gal.	Bik.	Gal.	Bik.	Gal.	Bik.	Gel.	Bik.	Gal.	Bik.	Gel.	Bik.	Gal.	Blk.	Gal.	Bik.	Gal.	Bik.	Gal
parrows Pt. B3 congatewn R3 contans KI itteburgh J3 diten, III. L1 darsen M3 airless N7 tittsburgh NI bleating W5 beating W5 congatewn YI ordinan Harber YI arain N2	16.50 18.50 6.90 18.50 16.50 18.50 18.50 18.50 18.50 18.50	1.25 1.25 13.25 1.25 1.25 3.25 3.25 3.25 3.25 3.25 3.25	21.50 19.50 21.50 19.50 21.50 21.50 21.50 21.50 20.50	5.25 7.25 5.25 7.25 7.25 7.25 7.25 6.25	24,00 24,00 23,03	8.75 8.75 +5.75 10.75 8.75 10.75 10.75 10.75 10.75 10.75	24.50 26.50 14.00 26.50 24.50 26.50 26.50 26.50 26.50 26.50 26.50 26.50	9.50 10.00 +4.00 11.50 9.50 11.50 9.50 11.50 11.50 11.50 11.50	25.00 27.00 14.50 27.00 25.00 27.00 27.00 27.00 27.00 27.00 27.00 27.00	10.50 11.00 +3.00 12.50 10.50 12.50 12.50 12.50 12.50 12.50 12.50	27.50 15.00 27.50 25.50 27.50 25.50 17.50 17.50 27.50 27.50 27.50	11.50 +2.50 13.00 11.00 13.00 11.00 13.00 13.00 13.00 12.00	27.00 29.00 16.50 29.00 27.00 29.00 29.00 29.00 29.00 29.00 29.00 29.00 29.00	10.75 11.75 +1.75 12.75 10.75 12.75 12.75 12.75 12.75 12.75 12.75 12.75	6.50 6.50		10.50 10.50	+6.25 +6.25 +6.25	13.00 13.00	+3.75	14.50 14.50	+2.2
EXTRA STRONG PLAIN ENDS parrava Pt. B3. congetown R3. saicleas N2. saicleas N2. saicleas N3. lites, B1. lites, B1. lites, B1. lites, B1. lites, B1. lites, B2. lites, B3. lites, B4. songatown V7. songatown V7. company N7.	21.00 23.00 21.00 10.50 23.00 21.00 23.00 23.00 23.00 23.00 23.00 23.00 23.00	9.25 7.25 9.25 9.25 9.25 9.25 9.25 8.25	27.00 25.00 14.50 27.00 25.00 27.00 27.00 27.00 27.00 27.00	11.25 11.25 13.25 11.25 13.25 13.25 13.25 13.25 13.25 13.25	29.00 27.00 16.50 29.00 27.00 29.00 29.00 29.00 29.00 29.00 28.00	16.75 14.75 16.75 16.75 16.75 16.75 16.75	27,50 17,00 29,50 27,50 29,50 29,50 29,50 29,50 29,50 28,50	14.00 13.50 15.50 13.50 15.50 15.50 15.50 15.50 15.50	30.00 28.00 17.50 30.00 28.00 30.00 30.00 30.00 30.00 29.00	15.00	30.50 28.50 18.00 30.50	15.50 15.00 17.00 15.00 17.00 17.00 17.00 17.00	31,00 29,00 18,50 31,00 29,00 31,00 31,00 31,00	14.75 13.75 15.75 13.75 15.75 15.75	8.00	0 +6.00 0 +6.00 0 +6.00	13.0	+2.71 +2.71 +2.71	15.54 15.54 15.54	+0.25 +0.25 +0.25	29.5	4.1

Thronds only, buttwold and sounless 2½ pt higher discount. Plain ands, buttwold and sounless, 3-in, and under, 5½ pt higher discount.

Galvanised discounts hased on sinc price range of over 9½ to 1½ per lb. East St. Louis. For each 2½ change in sinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1½, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., a.g., sinc price range of over 1½ to 1½ would lower discounts; sinc price in ronge over 7½ to 9½ would increase discounts. East St. Louis sinc price now 13.50¢; per lb.

TOOL STEEL

P.o.b.	merr		*	7			,	M	r.						C					er lb
18	4		1					_	•					1	_	_			-	\$1 60
18	4		1												1	g			,	2 305
18	4		- 2					_	_						_	_				1.765
1.8	4		3	1.8	1				8						_	-			,	.96
6	4		2	3					ĕ					,	_	_				1.35
6	4		1	1					6					,	_	_			1	1.105
High-c	arbon	chi	POI	m	lu	I	n													.77
Oll har	rdened	ma	n	R1	LT	16	en	e												.43
Special	carbo	n																		.39
EXTER	carbon						٠													.33
Regula	r carb	on				٠												4		.275
War	ehouse	pr	ie	es	1	0	n	ı	8	u	36	î	Ġ	8	a.	8	t	0	t	Mis-
glesipp	i are	44	Y	e	P		n			h	14	or l	h	0	p		-	W	08	t of

CLAD STEEL Base prices, cents per lb f.o.b.

		Plate	(A3, J2	?, L4)	Sheet (12)
	Cladding	10 pet	15 pet	20 pet	28 pct
	304	39.30	33.15	36.05	32.50
=	316	35.50	38.45	41.40	47.90
den Try	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
200	485	25.80	29.60	33.35	
	410, 430	25.30	29.10	32.85	

CR Strip (S9) Copper, 10 pct, 2 sides, \$8.00; 1 side, \$0.00.

ELECTRICAL SHEETS

22-Gage	Hot-Rolled	Coiled or	
F.a.b. Mill Cents Per Lb	(Cut Lengths)*	Semi- Processed	Fully Processed
Field	8.40	8.60	
Armature	9.35	9.60	. 10,16
Elect	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dyname	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
Trans. 65	13.35	Grain C	Priented
Trans. 58	13.85	Trans. 80	17.45
Trans. 52	14.85	Trans. 73	17.95

Producing points: Boach Bottom (W5); Brackenriége (AB); Granite City (G2); Indiana Harbor (I3); Mansfield (EB); Newport, Ky. (M5); Niles, O. (M3); Vandergrift (UI); Warren, O. (R3); Zanesville (A7) Cails 75¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural content, delivered lower Lake perts. Prices for 1956 season. Freight changes for seller's account.

Openhearth lump	
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

Metropolitan Price, dollars per 100 lb. WARE-HOUSES Plates Shape Sheet Strie Bars Alloy Bars Cald-Rolled Galvanirad (10 gage) 7.65 7.93 7.61 8.62 14.38 Baltimara....\$.10 7.31 8.32 8.37 7.63 16.36 Birmineham.... .15 7.93 8.85 7.06 6.99 7.28 7.08 9.35 8.91 10.37 8.06 8.23 7.97 9.77 13,60 16.70 8.40 10.16 7.50 7.75 7.50 8.25 13.45 16.58 7.58 7.42 13.20 nati.......15 8.23 7.89 7.90 13.59 13.29 16.44 16.39 9.10 7.45 Gaveland.......15 7.28 8.24 8.95 7.31 7.77 7.76 7.33 13, 41 13.11 16.26 16.21 8.60 10.76 11.22 3.96 8.60 8.75 8.90 9.82 17.97 Detroit 15 7.47 8.43 9.53 7.49 7.88 7.90 7.55 13.70 13.40 16.55 16.50 7.85 8.75 10.49 8.15 7.89 8.29 8.25 14.35 14.60 17.15 17.05 8.76 9.17 7.73 7.95 7.75 13.87 13.52 16.57 8.85 8.25 Les Angeles.... . 10 11.16 11.00 7.12 8.25 7.38 7.31 7.60 7.40 9.15 7.75 7.51 13.29 7.37 8,48 9.34 7.45 7.69 8.69 16.39 ow Orleans... .15 8, 35 7.45 7.49 7.70 7.50 9.55 7.20 13.53 7.71 8.94 9.69 8.27 7.96 8, 19 8.21 9.68 16.63 7.65 7.45 7.95 7.45 8.52 9.47 7.78 7.84 7.78 13.31 Philadelphia... . 10 Pittsburgh......15 7.28 8.24 9.40 7.31 7.60 7.43 7.27 13.05 16.20 16.15 7.85 8.15 9.20 8.80-10.15 8.00 7.95 7.75 7.95 12.20 15.00 17,50 Salt Lake City. . . 20 9.35 9.15 8,45 8.15 8,35 8.25 San Francisco....10 8.20 9.75 10.25 11.55 14.45 18,00 8.65 10.40 10.80 8,90 8,48 8,40 8.60 14.65 St. Louis 15 7.57 8.68 9.84 7.65 7.89 7.98 7.71 8.44 13.49 16.59 8.59-9.14 St. Paul25 7.72 7.65 7.94 7.74 8.51 13.51 7.84 9.89

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions: (1) 1500 to 9999 lb. (2) 1600 lb or over. (3) 3.25 delivery. (4) 1000 to 1999 lb. (5) 1000 to 1999 lb. (6) 1000 to 1999 lb. (7) 1000 to 1999 lb. (8) 1000 to 1999 lb. (9) 1000 to 1999 lb. (1) 1000 to 1999 lb. (1)

MERCHANT WIRE PRODUCTS

	Standard & Ceated Nails	Weven Wire Fence 9-15½ ga.	"T" Fence Pests	Single Leep Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
F.e.b. Mil I	Cal	Col	Col	Cal	Cel	¢/lb.	¢/lb.
Alabama City R3. Aliquipas, Pa. J3. Alianta A8. Bartenville K2* Buffalo W6. Chicage, Ill. N4** Clevaland A6. Craviordaville M4*. Donora, Pa. A5. Duluth A5. Fairfield, Ala. T2. Galvaston D4. Houston S2. Johnstown, Pa. B3*. Joliet, Ill. A5. Kakeno, Ind. C9. Las Angelos B2* Kansas City S2. Minnequa C6. Moseassen P6. Moseassen P6. Moseassen P6. Textamouth P7. Rankin, Pa. A5. S. San Franciaco C6. Sparrown Pt. B3* S. San Franciaco C6. Sparrown Pt. B3* Strutbers, O. Y1. Wercaster A5.	152 154 154 152 157 154 152 157 157 157 157 157 157 157 157 157 157	162 167 168 166 162 162 162 170 166 162 154 167 167 162 162 163 162	162	175 173 173 175 175 175 175 175 178 178 179 173 173 173	180 181 179 175 175 175 175 175 175 177 180 180 180 175 175 177 180 180	7.40 7.50 7.40 7.40 7.50 7.50 7.50 7.50 7.50 7.50 7.50 7.5	7.89 8.022 8.19 7.89 8.05 7.99 7.99 8.05 7.99 8.05 7.99 8.05 7.98 8.05 7.98 8.05 7.98 8.05 7.98 8.05 7.98 8.05 7.98 8.05 7.80 8.05 8.05 8.05 8.05 8.05 8.05 8.05 8

Galvanized products computed with zinc at Sé per lb Exceptions: "zinc at 12.5¢ per lb; "*13¢ zinc.

C-R SPRING STEEL

		CARB	ON CO	DNTEN	T
Cents Per Lb F.o.b. Mill		0,41- 0,60		0.81- 1.05	1.06-
Bristel, Conn. W12 Buffalo, N. Y. R7	7.00	8.95	10.80	12.95 12.65	15.65 15.35
Carpegie, Pa. S9		9.05	10.60	12.75	15.35
Cleveland A5 Detroit D1			10.60	12.75 12.85	15.45
Detroit D2			18.70	14.00	
Harrison, N. J. CII			10.90	13.05	15.75
ndianapolis C5			10.50	12.65	
New Castle, Pa. B4			10.50	12.65	
New Haven, Conn. D1. Pawtucket, R. L. N7	7.55		10.90	13.05	15.75
Pittsburgh S7	7, 10		10.60	12.75	
Riverdale, Ill. Al			10.60	12.75	
Sharon, Pa. Sl		9.05	10.60	12.75	15.45
Frenten R4			10.00	12.95	15.65
Wallingford W1 Warren, Ohio T4			10.80	12.65	
Wairton, W. Va. W3			10.50	14.00	
Worcester, Mass. 45.	7.65		10.98	13.05	15.73
Youngstown C5			10.50	12.65	

BOILER TUBES

S per 100 ft. carload	Si	28	Sean	nless	Elec.	Weld
lots, cut 10 to 24 ft. F.o.b. Mill	OD- in.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcack & Wilcox	2 21/2 3 31/2 4	13 12 12 11 10	41.57 47.99 56.03	49.16 56.76 66.27	29.93 40.31 46.55 54.34 72.17	
National Tube	2 23/4 3 33/4 4	13 12 12 11 10	42.57 47.99 56.03	49.16 56.76 66.27	29.93 40.31 46.55 54.34 72.17	
Pittsburgh Steel	2 21/2 3 31/2 4	13 12 12 11 10	41.57 47.99 56.03	36.51 49.16 56.76 66.27 88.00		

RAILS, TRACK SUPPLIES

F.e.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Join! Bara	Track Spikes	Screw Spikes	Tie Plates	Track Bel.s Untreated
Bessemer UI	4,725	5.65	5, 825				
So. Chicago R3.							
Ensley T2	4.725	5.65					
Fairfield T2		5.65		7.90		5.625	
Gary Ul	4.725	5.65				5.625	
Ind. Harbor 13.	4.725		5.825	7.90		5.625	
Ind. Harbor YI				7.90			
Johnstown B3.		5.65					
Joliet U/		5.65	5,825				
Kansas City S2. Lackawanna B3				7.90			
Lackawanna B3	4.725	5.65	5,825			5.625	
Lebanon B3 Minnequa C6							12.15
Minnequa Co	4.725	6.15	5.825	7.98		5.625	
Pittsburgh 01.							
Pittaburgh P5							
Pittsburgh J3				7.98			
Seattle B2	17222			8.40		5.775	12.93
Steel on B3	4.725		5.825	2-22		5.625	
Struthers Y1				7.90		4.144	
Torrance C7							****
Williamsport SS							
Youngstown R3.	deces.			1.90			

Furnace.	beehive	(f.o.b.	oven)
Connell	sville, P	a	\$14.00
Foundry,	beehive	(f.o.b.	oven)
Connell	sville, I	a	\$16.0
Foundry	oven co	ka	

Connellsville, Pa \$16.00 to \$16.	50
Foundry, oven coke	
Buffalo, del'd\$28.	75
Chicago, f.o.b 27.	00
Detroit, f.o.b 27.	50
New England, del'd 28.	55
Seaboard, N. J., f.o.b 26.	75
Philadelphia, f.o.b 26.	50
Swedeland, Pa., f.o.b 26.	50
Painesville, Ohio, f.o.b 27.	
Erie, Pa., f.o.b 27.	50
Cleveland, del'd	43
Cincinnati, del'd	59
St. Paul, f.o.b	50
St. Louis, f.o.b 28.	50
Birmingham, f.o.b 25.	65
Lone Star, Tex., f.o.b 19.	

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

Price 23.00 22.25 22.50	Diam. (In.)	Length (ln.)	9.90 9.90
22.25	35		
		110	3.98
	30	.10	10.05
23.00	24	72 to 84	10.30
23.50	29	90	10.10
24.25	17	72	10.35
24.50	14		10.85
27.25	12	60	11.75
30.25	10	60	11.80
32.00	8	60	12.10
	23,50 24,25 24,50 27,25 30,25	23,50 20 24,25 17 24,50 14 27,25 12 30,25 10 32,00 8 33,75	23,50 20 90 24,25 17 72 24,50 14 72 27,25 12 60 30,25 10 60 32,00 8 60 33,75

^{*} Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES (Cents per lb, frt allowed in quantity)

- oppos	
Cast elliptical, 18 in. or longer,	
5000 lb lots	58.92
Electrodeposited	55.25
Brass, 80-20, ball anodes, 2000 lb	
	58.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 2¢ per lb)	20.75
Nickel, 99 pct plus, rolled carbon (rolled depolarized add 3¢ per lb	90.50
Cadmium	
Tin, ball anodes and elliptical. \$1.06 to	81 10
	41.10
Chemicals	
(Cents per lb, f.o.b. shipping poin	(3
Copper cyanide, 100 lb drum	83.50
Copper sulphate, 5 or more 100 lb	
	18.15
Nickel salts, single, 4-100 lb bags	33.21
Nickel chloride, freight allowed.	
300 lbs	43.50
Sodium cyanide, domestic, fob N. Y.	
1 to 4 200 lb drums	21.5
(Philadelphia add .50 per lb)	
Zinc cyanide, 100 to 900 lb	55.51
Potassium cyanide, 100 lb drum	
N. Y	48.00
Chromic acid, flake type, 1 to 20	
100 lb drums	31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

		unts
Fu	ill F	ull cas
Cas	se 2	0,000 11
		or mor
		04 11101
½ in. & smaller x 6 in. &		
shorter	61	63
Larger than 1/2 in. diam. and		
all diam, longer than 6 in.	55	57
Rolled thread carriage bolts		
1/2 in. & smaller x 6 in. and		
shorter	61	63
Lag, all diam. x 6 in. &	0 A	00
shorter	61	63
Tag all diam langer than	01	0.0
Lag, all diam. longer than	-	57
6 in.	55	
Plow bolts	61	63
Nuts, Hex, HP, reg. & hvy.		
34" or smaller	64	66
%" to 1%" inclusive	63	
11/ " to 11/ " inclusive		65
1 1/4 " to 1 1/4 " inclusive	65	67
1%" and larger	61	63

C.P. Hex regular & hvy. %" or smaller 64 %" and larger 61

Hot	Galv.	Nuts	(ali	types)		
1 1/2"	or sn	naller			44	

Finished, Semi-finished, Hex Nuts %" and smaller 66 %" and larger 63 Add 25% for less than case or keg quantity.

Rivets

						1	B	a	8 e	p	er	1.0	0	16
½ in	. ar	id lai	rger			 						8	9.	95
												ff		int
7/16	in.	and	sma	ıller		 								32

Cap Screws

Cap Screws		
	Die	H.C. Heat
Bright T	reated	AATOT RACING
New std. hex head, pac aged	k-	
¼" thru ½" diam. x	6"	
and shorter 9/16" and %" x 6" a	34	20
smaller and shorter	. 31	16
%", %", 1" x 6" a	. 9	+11
New std. hex head, bul 4" thru 4" diam. x	k*	
and shorter	49	41
9/16" and %" diam. x	6"	
and shorter	48	39
shorter	. 31	20
*Minimum quantity	per item	1
5 000 pieces 4", 5/16" 1/	" 9/16"	iam.
15,000 pieces ¼", 5/10 5,000 pieces 7/16", ½ 2,000 pieces ¾", ¾",	1" dian	1. 78 Giam.

Machine Screws & Stove Bolts

		LMSC	oune
		Mach. Screws	Stove
Packaged, Bulk, bulk	package list	27	38
	Quantity		
¼-in. diam. & under	25,000-200,000	20	61
5/16-in. diam. & larger	{ 15,000-100,000	20	61
All diam. over 3 in. long	\$ 5,000-100,000		61

Machine Screw & Stove Bolt Nuts

		Dis	count
Packaged, Bulk, bulk	package list	Hex 24	Square 27
	Quantity		
%-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

CMSI	1100	v	11		w	v	-	м	л	ь	В	•	u		ц	8	я		LL.		-	
Birming	han	n					, .				0			0						1	09.	
New Yo	rk																			1	21.	5
Chicago																						
San Fra	inci	BC	0-	L		A	1.													1	31.	1
Dec.	195	5	2	a	Įα	ie		1	9	la	LS	18		1	B	6	27	n	h	ea	rie	y
6 in. or																						
planatio																						
U. S. Pi	ne i	290	à	E	0	24	99.	do	m		1	4										

REFRACTORIES

Fire Clay Brick	Carloads per 1000
First quality, Ill., Ky.,	Md., Mo., Ohio, Pa.
(except Salina, Pa., No. 1 Ohio	
Sec. quality, Pa., Md., K	y., Mo., Ill. 114.00
No. 2 Ohio	
(except Salina, Pa., a	

SHIEG BLICK	
Mt. Union, Pa., Ensley, Ala.	128.00
Childs, Hays, Pa	138.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty	101.00
Hays, Pa., Athens, Tex., Wind-	145.00
ham, Warren, O	
Curtner, Calif.	163.04
Silica cement, net ton, bulk, East-	
ern (except Hays, Pa.)	21.04
Silica cement, net ton, bulk, Hays,	
Pa	24.06
Silica cement, net ton, bulk, Chi-	
cago District, Ensley, Ala	22.00
Silica cement, net ton, bulk, Utah	
and Calif.	32.06
Mill County	

Chrome										aet ton
Standard										
ner, Ca										101.25
Burned, I	Balt.			 	11		0			85.00

Magnesite Brick

ltimoreonded, Baltimore	

		St. % -in. grains
in bulk	f.o.b. Baltimore fines removed f.o.b. Chewala	\$64.00
Luning, in bulk	Nev.	40.00

Dead														t tan
F.o.b. Pa.,	W.	Va.,	Oh	io	in:	g.	F	00	in	LE .	 1	n	. 8	15.00
Midy	vest										 -	10.7	0	15.69 14.00

METAL POWDERS

Per pound, f.o.b. shipping point, lots, for minus 100 mesh.	n ton
Swedish sponge iron c.i.f.	
New York, ocean bags	9.50¢
Canadian spronge iron,	
Del'd in East, carloads	9.50
Domestic sponge iron, 98+%	
Fe, carload lots	9.5€
Telegan lutio inon appealed	2.00
Electrolytic iron, annealed,	27.5c
	27.00
domestic 99.5 + % Fe	36.5¢
domestic 99.5 + % Fe Electrolytic iron, unannealed	
minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting	
stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10	
micron, 98%, 00.8+% Fe86.0¢ to	0 \$1.55
Aluminum freight allowed	34.50€
Brass, 10 ton lots 37.50¢ to	50.000
Copper, electrolytic	61.50¢
Copper, reduced Cadmium, 100-199 lb. 95¢ plus meta	Lyalua
Cadmium, 100-139 ib. 33¢ pius meta	Value
Chromium, electrolytic 99.85%	\$5.00
min. Fe .03 max. Del'd	
Lead7.50¢ plus meta	i vaiue
Manganese	70.0¢
Molybdenum, 99%\$3.00 to	D \$3.2a
Nickel, unannealed	\$1.00
Nickel, annealed	\$1.06
Nickel, spherical, unannealed,	
#80	\$1.18
Silicon	43.50¢
Silicon Solder powder. 7.0¢ to 9.0¢ plus met	value
Stainless steel 209	99.0€
Stainless steel, 302 Stainless steel, 316	81.32
Staniess steel, old	l walne
Tin	RA SO
Tungsten, 99% (65 mesh)	20 504
Zinc, 10 ton lots 18.75¢ to	22.306

Can a Towmotor Solve My Handling Problems?



Read how a Steel Fabricator increased storage capacity 75%. Ask for Job Study #145

THERE'S ONLY ONE FORK LIFT TRUCK CALLED TOWMOTOR

Towmotor Fork Lift Trucks and Towmotor Job-Planned Accessories are "tailor-made" for your particular application in many ways. Soundly engineered by materials handling specialists, the Towmotor line includes 15 different models and more than 60 interchangeable attachments, for every handling need.

Ask your nearest Towmotor Representative to show you what Towmotor equipment can do to speed your materials handling, cut man-hour costs and make maximum use of storage space! . . or write for Certified Job Studies covering your industry. Towmotor Corporation, Div. 1503, 1226 E. 152nd St., Cleveland 10, Ohio.

TOW MOTOR

America's best-engineered fork lift truck

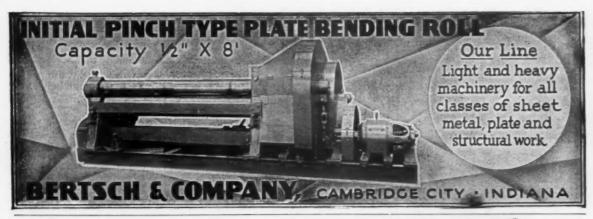
See the TOWMOTOR EXHIBIT



Cleveland Auditorium-June 5-8

Ferroalloy Prices (Effective March 20, 1956)

(Effective March 20, 1956)			
Ferrochrome Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si. 0.02% C 38.50 0.20% C 35.50	Spiegeleisen Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa. Manganese Silicon 16 to 19% 3% max. \$89.50	Alsifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspen- sion Bridge, N. Y., per lb. Carloads 1 Ton lots 1	.0.65¢ 1.80¢
0.02% C 38.50 0.20% C 35.50 0.03% C 38.00 0.50% C 35.25 0.66% C 36.50 1.00% C 34.00 0.10% C 36.00 1.50% C 33.85 0.15% C 36.70 1.50% C 33.85 0.15% C 56.70% C 1.20% C 33.75 2.50-5.00% C, 57-64% Cr, 2.00-4.50%	19 to 21% 3% max. 91.59 21 to 23% 3% max. 94.00 Manganese Metal	Calcium molybdate, 43.6-46.6% f.o.b. Langeloth, Pa., per pound contained Mo	\$1.34
4.00-4.50 C, 67.70% Cr, 1-2% Si 26.25 3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si 25.00 0.025% C (Simplex) 31.75	Contract basis, 2 in. x down, cents per pound of metal, delivered. 95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	x D contract basis, delivered per pound contained Cb.	\$6.90 6.95
High Nitrogen Ferrochrome Low-carbon type 0.75% N. Add 5¢ per	Si, 2.5% max. Fe. Carload, packed	Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in, x	
Low-carbon type 0.75% N. Add 5¢ per b to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.	Electrolytic Manganese F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O.,	Ferromolybdenum, 55-75%, 200-1b containers, f.o.b. Langeloth,	\$4.65
Chromium Metal Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe. 0.10% max. C \$1.27 0.50% max. C \$1.27	delivered, cents per pound. 31.50 Carloads 32.50 Ton lots 33.50 250 to 1999 lb 35.50 Premium for hydrogen-removed metal 0.75	Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton	190.00
0.50% max. C	Medium Carbon Ferromanganese Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn. 22.85	Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls. N. Y., and Bridgeville. Pa., freight allowed, ton lots, per 1b contained Ti	\$1.35
plate (1/4" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max. Carloads 1.25 Ton lots 1.27 Less ton lots 1.29	Low-Carb Ferromanganese Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%. Carloads Ton Less	Ferrottanium 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti Less ton lots.	\$1.50 \$1.55
Low Carbon Ferrochrome Silicon (Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed. Carloads 41.85 Ton lots 46.15	0.07% max. C. 0.06% P. 90% Mn 34.00 35.55 36.75 0.07% max. C 31.95 33.50 34.70 0.10% max. C 30.20 32.75 33.95 0.15% max. C 29.45 32.00 33.20 0.30% max. C 27.95 30.50 31.70	Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, car- load, per net ton	
Less ton lots	0.50% max. C 27.45 30.00 31.20 0.75% max. C, 80-85% Mn, 5.0-7.0% Si 24.45 27.00 28.20	Ferrotungsten, 4 x down. packed, per pound contained W, ton lots, delivered	\$3.45
Contract price per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe. Carloads	Silicomanganese Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢	Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. bags, f.o.b. Washington, Pa., Langeloth, Pa.	\$1.32 \$1.30
Ton lots	Carload bulk 12.00 Ton lots 13.45 Briquet contract basis carloads, bulk, delivered, per lb of briquet 13.55		17.50¢ 19.50¢ 20.00¢
lump, delivered, packed 16-20% Ca, 14-18% Mn, 53-59% Si. Carloads Ton lots 24.95 Less ton lots 25.95	Ton lots, packed	Vanadium oxide, 86-89% $V_{\sigma}O_{\Sigma}$ contract basis, per pound contained $V_{\Sigma}O_{\Sigma}$	\$1.33
Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn. 5-7% Zr.	Si 15.50 to 16.00 pct, f.o.b. Keokuk, lowa, or Wenatchee, Wash, \$98.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	12-15%. del'd, lump, bulk-	26.25
20% Fe ½ in. x 12 mesh. Ton lots	Silicon Metal Contract price, cents per pound contained Si, lump size, delivered, packed.	Boron Agents Borosil, contract prices per 1b of	8.50
V Foundry Alloy Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% St, 8-11% Mn, packed.	96.50% Si, 2% Fe 22.75 21.45 28% Si, 1% Fe 23.25 21.95	alloy del. f.o.b. Philo, Ohio, freight allowed. B 3.14%, Si 40-45%, per lb contained 2	\$5.2
Carload lots 17.20 Ton lots 18.70 Less ton lots 19.95	Silicon Briquets Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.	Bertam, f.o.b. Niagara Falls Ton lots, per pound Less ton lots, per pound Corbortam, Ti 15-21%. B 1-2%. Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y	45 50
Graphidex No. 4 Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%,	Carloads, bulk 7.15 Ton lots, packed 9.75	freight allowed Ton lots per pound	10.00
Ca 5 to 7%. Carload packed 18.50 Ton lots to carload packed 19.65 Less ton lots 29.90	Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.	max. Si, 0.50% max. Al, 0.50% max. C. 1 in. x D, ton lots	1.2
Ferromanganese Maximum contract base price to b	50% Si 12.75 75% Si 15.40 65% Si 14.50 85% Si 17.10 90% Si 18.50	10 to 14% B	1.2 1.5
lump size, base content 74 to 76 pet Mn. Producing Point Ashtabula, O.: Alloy, W. Va.; Sheffield, Ala.; Portland,	Calcium Metal Eastern zone contract prices, cents per pound of metal, delivered.	freight allowed, 100 lb and over No. 1 No. 79 Manganese - Boron, 75.00% Mn.	\$1.0 50
Ore. 10.75 Johnstown, Pa. 10.25 Sheridan, Pa. 10.25	Cast Turnings Distilled Ton lots \$2.05 \$2.95 \$3.75 Less ton lots . 2.40 3.30 4.55	15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.	
S. Duquesne 10.25 Add or subtract 0.1¢ for each 1 pct Mn above or below base content. Briquets, delivered, 66 pct Mn:	Ferrovanadium 50-55% V contract, basis, delivered, per pound, contained V, carloads, packed. Openhearth 3,10	D, del'd. Ton lots Less ton lots Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. B, 0.50% max. C, 3.00% max. Fe, balance	\$1.4
Ton lots packed 15.20	Crucible 3.20 High speed steel (Primos) 3.30	Max. C, 3.00% max. Fe, balance Ni, del'd less ton lots	\$2.0





Lens panel of this modern camera is aluminum RIGID-tex Metal. Pattern 2-05. Its high strength and rigidity give excellent protection to the shutter mechanism...adds beauty too! See Sweet's Design File 1a/Ri or write us for complete information.



RIGIDIZED METALS CORP. 6693 OHIO STREET BUFFALO 2, N. Y.

It's RIGIDITED Sales Representatives in Principal Cities

GULMITE TOOLS Send for our free brochure on Gulmite Tools -a serrated tool for every purpose. Also listed are various sizes that fit the different makes of drives, wrenches and drive adapters. A partial list of manufacturers who use Gulmite Tools contains names of well known firms that invite confidence. BERGANDER MFG. CO.

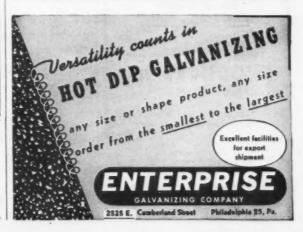
WIRE - STRIP, COILED FOR ELECTRIC FUSE **ELEMENTS** EYELETS ALSO BRASS OR STEEL THE PLATT BROS. & CO., WATERBURY, CONN.



ARMSTRONG T-SLOT CLAMPS

Make rigid set-ups in minutes on planers, drill presses, milling machines or other T-slotted beds or platens. Clamp slides or rotates to position on anchoring T-slot bolt. Drop forged, heat-treated body. Heat-treated screw has V-slotted swivel

Write for Bullstin SUT S209 Armstrong Ave., Chicago 30, U.S.A.



2129 WARNER AVENUE CHICAGO 18, ILLINOIS

RAILWAY EQUIPMENT FOR SALE

Used - As Is - Reconditioned

RAILWAY CARS

All Types

SERVICE-TESTED

FREIGHT CAR REPAIR PARTS

For All Types of Cars

LOCOMOTIVES

Diesel, Steam, Gasoline, Diesel-Bectric

70-TON CAPACITY ALL-STEEL, TRIPLE HOPPER CARS

"As Is" or repaired to suit.

RAILWAY TANK CARS and STORAGE TANKS

6,000- 8,000- and 10,000-Gallon Cleaned and Tested

CRANES

Overhead and Locomotive

RAILS

New or Relaying

IRON & STEEL PRODUCTS, Inc.

General Office

13496 S. Brainard Ave. Chicago 33, Illinois Phone: Mitchell 6-1212

New York Office

50-b Church Street New York 7, N. Y. Phone: BEekman 3-8230

"ANYTHING containing IRON or STEEL"

News of Used and Rebuilt Machinery

Chicago Boom Means Business . . . Chicago is in the grip of an industrial boom. Add that to record industrial production and you realize why used tool men are finding it virtually impossible to keep a sizable stock of tools in inventory.

Problem now is to check enough auctions and contact enough potential suppliers of used equipment to keep up with current demand.

One aspect of expanding Chicago has been a mild boon. In the course of clearing a path for two superhighways into the city, a number of small plants have been displaced and have thrown some of their equipment on the used tool market.

The total of displaced plants will eventually reach several hundred, but it's not enough to ease the still climbing demand for used tools.

What's Selling Best? . . . It's almost impossible to arrive at a list of tools most in demand since the whole range of equipment types is being sold at a hot pace.

If anything is slightly tighter than the average, it might be heavy lathes and presses, surface grinders, vertical millers, and boring mills.

Automatic screw machines are rapidly dwindling in supply and even drill presses, press brakes, shears, and converted equipment is going out faster than it is coming in.

Prices Still Climbing . . . Dwindling supplies, coupled with long backlogs of new tools, is combining to continue the upward price squeeze that's been apparent since the middle of fourth quarter '55. Current indications are that the drift upward in prices will continue for at least several months.

Trade Peaks Unpredictable . . . Normally, used tool men find

their trade peaking in late May and early June. It's a moot question if such will be the case this year.

Not that demand will lag. But supplies may not sustain further volume increases.

Local plant building and rebuilding have been extremely heavy over the winter months, wiping out the normal inventory building that enabled used tool men to stock in advance for the spring rush.

Lots Of Customer Inquiries . . . Customer inquiries continue at a high level, either equalling the previous last month or exceeding it.

And, coupled with a really hot local demand, is another influx of inquiries from the East. West Coast business and an unusually high level of sales in the Plains and Rocky Mountain areas have been producing Chicago business for months now.

Outlook Appears Rosy . . . The crystal ballers see no letup in the first half in both the number of inquiries and actual sales consummated. Those taking the long-range view expect only a slight slowdown (if any) in the second half.

The conclusion, increasingly, is that any tools that can be stocked at present are money in the bank. Thinking here stems from the fact that it seems pretty definite now that there will be no price weakening in purchase prices unless the whole market breaks badly in the second half.

And, with a hurryup in automotive changeovers, even that prospect is growing increasingly unlikely.

Rebuilders Doing O.K. . . . Rebuilder backlogs are not yet out of sight, and some fairly rapid deliveries have been reported. The aircraft tool market is strong.

CONSIDER GOOD USED EQUIPMENT

BALERS
Logemann Bales, Charging Box 00"x18"x16", Produces Bale approx. 100 lbs.
Logemann Bales, Charging Box 72x12x18". Produces

Logemann Heler, Charging Ben 72x12x18", 306 ib. Nale

B. MO18 G. ROLLS

B'x %' Hillies & Jones Pyramid Type

14' x 5/16' Hillies & Jones Pyramid Type

24' x %' Settled Initial Type Bending Roll

24' x %' Hillies & Jones Pyramid Type

12' x %' Dreis & Krump

18' RAKES—PRESS TYPE

10' x %' Cloclanati

10' x %" Cincinnati 14' x %" Cincinnati Series 120-14 BULLDOZERS

ULLDOZERS

\$5 Williams & White, 20" Stroke, 11½" x 63" Face
of Crosshead

\$27 Williams & White, 22" Stroke, 16" x 80" Face

CRANES-OVERHEAD ELECTRIC TRAVELING

| IES—OVERNEAD | ELECTRIC THAVELING
| ton P&H | 80' Span 230 Voit D.C.
| ton P&H | 80' Span 230 Voit D.C.
| ton P&H | 65' Span 330 Voit D.C.
| ton P&H | 65' Span 48/3/60 A.C.
| ton Bedford | 65' Span 48/3/60 A.C.
| ton Miwaukee | 80' Span 230 Voit D.C.
| ton Toledo | 75' Span 48/3/60 A.C.
| ton Toledo | 75' Span 59/3/60 A.C.
| ton Whiting | 75' Span 59/3/60 A.C.
| ton Whiting | 75' Span 59/3/60 A.C.

29 ton Toledo 75' Span 559/3/60 A.C. 120 ton Whiting 99' Span 220/3/60 A.C. FORGING MACHINE 1 to 5' Acme, Ajax, National FURNACES L&N Homo Carb Pit Type Furnace. Electric Fired 109 KW 229/440/3/60' Heri-Duty Electric Furnace, Hot Zone 18" high, 26"

Wide Opening, 19'9" Deep I.D.
Sunheam, Stewart Gas Fired Furnace 12" x 36" x 36"
15 ton Heroult Top Charge
GRINDER—ROLL
29' x 96" Landis, With Crowning Attachment
HAMMERS—BOARD DROP—STEAM DROP
STEAM FORGING—600 ib. to 20,000 ib.
HAMMERS—MISC,
35B Lobdell Nasel, Capacity 4" Square
2000 ib. Chambersburg Ceco-Drop
18" United, 13 Rolls 1½" Dia,
52" McKay, 17 Rolls 3%" Dia,
90" Budd-McKay Sheet Processor & Leveler, Leveling
Rolls 3%" dia,
86" Actina-Standard, 19 Rolls 2½" Dia,
86" Actina-Standard, 19 Rolls 2½" Dia,

Bolls 3% dis.

96" Actins - Standard, 19 Rolls 2½" Dis.

PLANERS—PLATE EDGE
36" x 1½" Southwark, 16 Pneumatic Jacks
33" x 1½" Southwark, 16 Pneumatic Jacks
PRESS—TAP FRAME
125 ton Beatty Inclined Open Back Gap Press, Stroke
1½" Bed Ares 23% x 26"%" (New)

PRESSES—HYDRAULIC
530 ton Baidwin Routhwark 12" Stroke 48" x 25"

PRESSES—HYDRAULIC

530 ton Baldwin Southwark 12" Stroke 48" x 25"

Between Columns

800 ton Clearing 48" Stroke, Bad Area 48" x 48"

1000 ton Lake Eris Double Acting 46" Stroke. Bed
Area 72" x 146"

1257 ton Baldwin Southwark Forging Press, 30"

Stroke Main Ram. 54" x 41" Bet. Columna

4500 ton B-L-R Hydr. Forging Press
PRESSES—STRAIGHT \$10E

28% 4P Zeh & Hahnemann Percussion Press 75 ton
Clearing Model TF31500-200 Triple Acting, Strokes

PUNCH & SHEAR COMBINATIONS

N. 2%" Buffal Inconvorter, Capacity Punch 15/16"

thru 1", Shear Angles 6 x 6 x %", Bound 2%"

Square 2", etc. With Coper & Notcher Style EF Cleveland 60" Throat, Punch 1½" thru 1" Style EF Cleveland 50" Throat, Punch 1½" thru 1" Style EF Cleveland 60" Throat, 312 Ton ROLLS—PLATELAND 1, Tools 10" Dia. 76" McKay Universal, 7 Rolis 10" Dia. 72" Hertach Seven 7" Dia. Rolls ROLLING MILLS. ROLLING MILLS

12" x 16" Phila, Single Stand, Two High
15" x 25" Farrel Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 21" Farrel Single Stand, Two High
12" x 12" x 40" Lewis 3-High Sheet Mill
12" Three High Bar Mill
ROLLS—FORMING
5 Stand Baffer Two Forming Machine, Spindle 1%"
SHEARS—GATE
60" x 1" Pal2" 1" Pal-60" x 1" Pels
80" x %" Pels
86" x 1" Hilles & Jones
SHEAR—ANGLE
6 x 6 x %" Cleveland
SHEARS—SQUARING
12"x3/16" Cincinnati #1412
12" x %" Steelweld

Yoder Gang Slitter, 5" Threaded Arbor Yoder Slitter, 7" Plain Arbor

5-30 Yoder Sittler, 7" Plain Arbor STRAIGHTENERS Kane & Roach 2 Roll Rotary Straightener, M.D. Capacity Midsteel 4," to 5," Actas-Standard 12 Roll Straightener. Capacity 24,"

O.D. Tubing
TESTING MACHINES
100,000, 200,000 © Olsen & Riehle Universal; 50,000
& 300,000 © Compression

Manufacturing

Confidential Certified Appraisals Liquidations - Bona Fide Auction Sales Arranged

A. T. HENRY & COMPANY, INC.

50 CHURCH ST., NEW YORK CITY B

Telephone COrtlandt 7 3437

Equipment

Consulting Engineering Service Surplus Mfg. Equipment Inventories Purchased

REBUILT-GUARANTEED **ELECTRICAL EQUIPMENT**

MOTOR GENERATOR SETS

Qu.	K.W.	Make	R.P.M.	Volts	A.C. Velts
1	2500	Whie.	729	600	4160-2300
2	1250	Whie.	720	600	2300
1	500	Cr. Wh.	720	600	2300/440
2	500	Whee.	1200	125/250	2300/440
1	400	Cr. Wh.	1200	125/250	2300/440
1	300	G.E.	1200	250	2300
1	200	G.E.	1200	250	2300
1	150	G.E.	1200	259	2300
1	100	When	000	950	9900 -

LARGE MILL MOTORS

Qu.	H.P.	Make	R.P.M.	Veits	Type
2	3000	Whae,	600	525	tandem
6	1500	Whae.	600	525	Encl.
1	1250	G.E.	350/790	600	MCF-6
4	800	Whse.	600	525	Enel.
4	700	Whee.	300/700	259	Encl.
2	600	Al. Ch.	300/600	600	Mill
1	250	Al. Ch.	250/1000	259/375	Mill

SLIP RING MOTORS Constant Duty, 3 Phase, 60 Cycle

Qu.	H.P.	Make	Type	Velts	R.P.M.
1	1500	G.E.	MT-498	2300	360
2	1000	G.E.	M-575-8	2300	1185
2	750	G.E.	I-M	2200	400
1	500	Al. Ch.	ANY	2280	505
1	500	G.E.	I-M	2300	450
1	450	G.B.	I-14-M	2300	505
î	450	Whae.	CW	2200	440
1	400	Al. Ch.	ANY	2200	505
1	400	G.E.	MT-424	2300/440	352
1	300	Whee,	CW-1012	2200	704
1	250	Al. Ch.	ANY	440	705
1	250	Whae.	CW-1106	2200	435
1	250	G.E.	MT-414	2200	300
2	200	Al. Ch.	ANY	2200	585
1	200	G.E.	I-14-M	2200	490
1	150	Al. Ch.	ANY	440/220	705
1	150	Whae.	CW	440/220	
1	150	Whae,	CW-1000	440/226	435
1	100	Whse.	CW	440/220	870
1	100	El. Dy.	EDY-613	2300	900
1	100	G.E.	MT-558	440/220	700
2	100	G.E.	I-15-A	2300	495
1	100	Al. Ch.	ANY	440/220	430

T. B. MAC CABE COMPANY

4302 Clarissa St., Philadelphia 40, Penna. Cable Address Phone 'Mecsteel" Philadelphia, Pa. Davesport 4-8300

Overhead Cranes & Hoists New and Used

10 Teo Cleveland Crane, 45'0" spam, 230 VDC with meter generator set. Cage Controlled. 5-teo P&H crane. 3-motor, 45'0" spam, 220 ve. 3 ph. 60 cy. tage operated. 100 Other Cranes, various spams, tennages and current. JAMES P. ARMEL, Crane Specialist 710 House Bids. Pittsburgh 22, Pa. Telephone: Gr. 1-4449

RE-NU-BILT **ELECTRIC POWER** EQUIPMENT A. C. MOTORS

3 phase-60 cycle SLIP RING

lu.	H.P.	Make	Туро	Volts	Speed
1	1500	G.E.	MT	6900	1187
1	1100	G.E.	1M	2300	720
1	1000	A.C.	Mill	2300	240
1	800	G.E.	MT	2300	293
ī	750	G.E.	MT-573	2200	1190
1	700	A.C.		2300	500
1	200	Whae.	CW	550	350
1	400	Whee.	CW-960A	440	1170
1	400	Whse.	CW	140	514
1	400	Whse.	CW-1213	2200	435
î	850	G.E.	IM-17A	440/2200	720
1	250	G.E.	MT-424Y	4000	257
1	250	G.E.	MT-5598	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	20QB	440	595
1	200	G.E.	IM	440	435
1	200	G.E.	IM	2200	580
1	150 (unused	Whse.	CW	2300	435
1	125	A.C.		440	865
1	125	Al. Ch. G.E.		440	720
1	100	G.E.	IM-16	2200	435
î	100	GE	IM	440	600
4	100	A.C.	ANY	440	695
		SOUIR	ANY REL CAG	E	
1	800	G.E.	KT-573	2200	1180
12001	650	G.E.	FT-559B		3570
2	450	Whee,	C8-1420	2300/4150	354
1	400	G.E.	DE-15B	2200	
î	400	G.E.	IK	2200	500
1	200	G.E.	137 - 17	440	580
8	200	G.E.	KT-557	440	1800
3	150/75	G.E.	TK	4409	00/450
î	150	Whae.	CS-856S	440	880
1	150	Whae.	CS		580
ê	125	Al. Ch.	C8 ARW	2200	1750
2	100	Whae.	C8-876C-	TEFC 440	710
-	***	SYNC	HROHOU	5	2.00
2	2000	Whee.		2300	128
2	1750	G.E.	ATI	2306	
1	735	G.E.	ATI	2200/12000	
1	500	Ideal	8M	2300/4160	
2	500	G.E.	TS-7567	2200	1200
1	450	Whee.	1001	2200	128.5
1	450	Whse.		2200	
2	400	G.E.	TS-7565	2200	1200
1	400	G.E.	TS 1303	2200	400
i	4350	G.E. C.W.	250191 4	000/6900/13	900 514
1	325	G.E.	ATT	440	1800
i	225	G.E.	ATI	440	1800
A	640	431. Mi.	06.8.8	440	1900

BELYEA COMPANY, INC.

47 Howell Street, Jersey City 6, N. J.

BENNETT MACHINERY CO.

LARGE LATHE

i—128" Swing x 96' Between Centers Niles Bement Pend Heavy Duty Engine Lathe—80" over carr., 2 earr. each with 15 h.p. motor. Drive motor 80 h.p., bed in four sections.

375 Allwood Rd., Clifton, New Jersey

SELECT MACHINE TOOLS

GRINDING MACHINES

72" Hamehett 3-spd. retary surface, new 1946. 16" x 96" Landis gap type cylindrical, new 1941. 13" x 60" Model 300 Hamehett vert, spdl., late.

HAMMERS
No. 6-1 Nazel, pneumatic, late.
No. 5N Nazel, self-contained.
No. 6B Nazel, self-contained.

LATHES
18" x 38" x 90" so Nobel gas lathe, 1941.
29" x 67" Axelsee H. D. engine lathe, late.
24" x 8" LeBlend H. D. engine lathe.
14" x 8' Hendey Toelroen, 1940.
3" x 30" Lipe Carbe-Matle, 1942.

MILLS
M-24 Kearney & Trecker Mfg, Mill,
1-18 Clincinenti production,
2-18 Clincinenti production, late model.
Model 2-20 Kenf-Owene byd, mill, late (2),
60° x 48° x 18° ingerved ind.j., rail planer type.
No. 3H K & T pla

PLANERS

38" Rockford Hyd. Openside Shapor-Planer. 48" x 48" x 10' Gray Maxi-Service.

PRESSES

PRESSES 90 ton No. 921/₂C Tolede D.C. Str. Side. 260 ton No. 786/₂-72 Tolede D.C. Toggle drawing. 500 ton No. 1038 Hamilton D.C. adj. bed. 60" x 192". 545 ton No. H3612/₂ Hamilton Forging Press.

SHAPERS
24" Gould & Eberhardt Universal.
32" G & E Invincible, F.M.D., late type.

SHEARS
56" x 3/16" Bertish power squaring shear, 18" gap.
96" x 10 GA Bilss power squaring shear.

UPSETTERS 3½" A Jax suspended slides, steel frame. 5" Ajax suspended slides, steel frames, air elutsh. 1½" National Upsetter, guided ram, hard ways. 2" National Upsetter, guided ram, air elutsh.

1000 Tools in Stock

Free Illustrated Catalog

MILES MACHINERY CO.

Phone Seginew 2-1105

3041 E Genetee Ave. Saginaw, Mich

Immediate Delivery

Used Swindell-Dressler

ELECTRIC ARC FURNACE

With Transformers, Switchgear, Controls, Ets.

Fabrikant Steel Products, Inc. New York, N. Y.

THE CLEARING HOUSE

ROLLING MILLS—STEEL WORKS EQUIPMENT

- -34" & 22" x i12" 3-High Plate Mill with front and back tilting tables. 1500 HP meter and sear set; also 84" 3-high jump mill. -34" & 22" x i00" 3-High Plate Mill with 3000 HP meter. -30" x 50" BLOOMING OR SLAB MILL, 2-High
- reversing.
- Howen:
 -28" 2-HIGH PINION STAND, modern design.
 -16'2" PINION STANDS, for hot strip mill.
 -4-HIGH NOT STRIP MILL STANDS, for up to
 75" width.
- width, & 22" x 40" 3-HIGH NOT SHEET ROUGH-is MILL, x 29" 2-HIGH COLD MILL, with gear set
- I—20" x 20" 2-HiGH COLD MILL, with gear set and motor.

 I—16" x 24" 2-HiGH COLD MILL. 2 stands, 400 HP gear set.

 I—12" x 18" 2-HiGH COLD MILL. 100 HP motor.

 I—24" BAR MILL, 3-HiGH, 3 stands, with variable speed D.C. meter, traveling titing tables, relier tables, saws, bloom shear, turnaces.

 3—18" BAR MILL, STANDS, 3-high.

 I—10" ROD MILL, 14 passes.

- 1-34" x 192" ROLL GRINDER with motors and 2—ROLLER LEVELERS, McKay, rolls 30" face x 51/4" dia., driven through gear box and universal
- 5%" dia., driven through gear Box and universal spindles.
 -80" ROLLER LEVELER, 17 rolls, backed-up.
 -81 ROLL LATHE esclosed headstock, talistock, plans rest, 20 HP. 500',1500 RPM, 250 voits D.C. meter and controls.
 -84" ROLL LATHE, esclosed headstock, talistock, plans rest, 20 HP. 500',1500 RPM, 250 voits D.C. meter and controls.
 -84" ROLL LATHE, esclosed headstock, 25 HP, -80', ROLL RESTORMENT, esclosed headstock, 25 HP, -94" ROLL RESTORMENT, esclosed headstock, 25 HP, -94" ROLL FURNACES for hot sheet mills, 62" x 80', deable chamber.
 -8-AJAX electric induction melting furnace, 2008 tix seach

- Ibs. each.
 -3-TON LECTROMELT electric melting furnace,
- good condition.

 1--00" MORGAN SAW, horizontal sliding frame.

 1--36" GALVANIZING LINE for sheets.

 1--MESTA GUILLOTINE SHEAR, 8" stroke, 28"
 knife, 600 tons pressure.

 1--26 UNITED ALLIGATOR SHEAR, 5" x 5".
- condition.

 -3500 HP GEAR DRIVE, ratio 6.45 to 1.

 -1300 HP GEAR DRIVE, ratio 9 to 1.

 -1200 HP GEAR DRIVE, ratio 9 to 1.

 -1200 HP MOTOR, 11000 velts, 3 phase, 60 cycle, 54 RPM.

 -1350 HP MOTOR, 2200 volts, 3 phase, 60 cycle, 353 RPM.
 - ASS RPM.

 4—TINNING UNITS for hot dipped tin plate
 2—DOWN-COILERS for hot strip up to 48" w
 1—38" UP-COILER, 3 rell type.

I-UNITED #4 vertical open side bar shear. 2-UNITED pertable cropping shears for bot bar

imed tubes.

I-COKE OVEN PUSHER, used very little, excellent

FRANK B. FOSTER, INC.

2220 Oliver Building, Pittsburgh 22, Pa.

Cable: "Foster, Pittsburgh"

4" National Upsetter High Duty, guided overarm slide, air clutch

Ajax & National Upsetters, suspended slide 1", 1½3", 2", 3", 4"; similar upsetters not suspended slides

700-ton Aigx High Speed Forging Press

50,000# Standard Double Draw Bench #3 Abramson Bar & Tube Straightener

Kling No. 6 Bar & Billet Shear, 6" rd.

Hilles & Jones and Buffalo Shears $1\frac{1}{2}$ ", 2", $2\frac{1}{2}$ ", $3\frac{1}{4}$ ", $3\frac{1}{4}$ ", 4" and $4\frac{1}{4}$ "

1600 & 2500# Chambersburg Model F Board Drop Hammers, Roller bearing; double V. ways. Built 1943

ISOO# Niles & 2500# Chambersburg Single Leg Steam Forging Hammers

4000# Niles Bement Double Frame Steam Forg

Bradley Hammers, all sixes, including 500±

Nazel Air Forging Hammers, #2-8, 4-8, 5-N Williams White Bulldozers, #22, #3, #4, #25 #6, #29 U-type

Landis Landmaco and other Landis Threading Machines from 1/4 to 4'

Single and Double End Punches

Multiple Punches

Pigte Shears

BOLT, NUT AND RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPPERS, COLD BOLT TRIM-MERS, SLOTTERS, HOT HEADERS AND TRIM-MERS, COLD AND HOT PUNCH HUT

DONAHUE STEEL PRODUCTS CO. 1913 W. 74th Street, Chicago 36, III.

USED STEEL MILL EQUIPMENT FOR SALE

- I—Mill Stand, 2-Hi, 17", Hyde Park, with pinion stand, shoe plates, furniture.
- I—Upcut Bloom Shear, U. E. & F. Co. hydraulic, 36" knives x 8" stroke.
- -34" x 13' Roll Lathe, U. E. & F. Co., with 20 HP DC motor. 8—Sheet Annealing Furnaces, radiant tube, Lee Wilson, with bases, inner covers; sizes from 36" x 172" x 60" to 72" x 144" x 60".

Lou F. Kinderman Box 182 - Niles, Ohio . Phone OL 2-9876

IMMEDIATE SHIPMENT

2-500 KW General Electric Synchronous Motor Generator Sets

Generators; type MPC, 240 Volts D.C. 900 RPM, 40 degree

Synchronous Motors: 725 HP. 830 KVA, 3 PH 60 Cycle 2200 Volts. Equipment: D.C. Panels and C R 7069YI

Synchronous Motor Panels



150 GRAND ST., NEW YORK 13, N. Y.

FOR SALE OR RENT

- 1-65 ton Diesel Elec. Locomotive
- 1-50 ton Diesel Elec. Locomotive
- 1-35 ton Diesel Elec. Locomotive
- 1-25 ton Diesel Locoomtive Crane
- I-35 ton Diesel Locomotive Crane
- I-10 ton Krane Kar
- I-3500 Manitowoc Crane
- 2-20 and 25 ton Truck Cranes

B. M. WEISS COMPANY

Girard Trust Building Philadelphia 2, Pa.



FOR SALE

I-#1412 Cincinnati Power Square Shear,

12 ft. 3/16" capacity. (New 1948) I—Model DW-60-36-2 Roto-Finish Rubber Lined Mechanical Finishing Machine for deburring and descaling operations on metal parts. Hot and cold water tanks, centrifugal dryer, automatic timer, chip bins, screens and baskets included. (New 1953)

-#158 Etna Rotary Swaging Machine, 8" max. length of die, Capacity to I-1/2" dia. tubing, Capacity to ¾" dia. solids. (New 1953)

-Grant #2-A Rotary Vibrating Riveter. (New 1953)

-Niagara A-5 open back inclinable geared press, 113 ton capacity, 4-1/2" stroke, equipped with 7-1/2 H.P. Motor, air counter balance and pneumatic draw cushion, regular and 4-1/2" thick bolster plate. Excellent condition. (New 1950)

I—Wittek #14L roll feed 4-1/2" stroke, 8 ft., chain, includes plunger plate, plunger and supports. (New August 1950)

Hynes Steel Products Company

3760 Oakwood Avenue Youngstown, Ohio

MOTOR GENERATOR SETS

8.84	JION OFILE	INIOII JE	1.3
KW	Make	A.C.	D.C.
1250	Woste.	6600/4160	600
1000	G.E.	12,000	600
500	Woste.	2300	275
400	A.G.	2306	120/240
300	Westa.	2306/440	250
200	G.E.	2300	250/275
200	Westg.	2500/4000	250/275
200	Ridgeway	2300	250
170	G.E.	440	125
150	G.E.	2300	125/25
150	A.C.	2300	275
150	Westg.	2300	125/250
150	G.E.	440	275
100	G.E.	2300	250
100	Elec. Mach.	440	123
100	G.E.	440	125
60	OF		60

CHICAGO ELECTRIC CO. 1335 W. Cermak Rd. Chicago 8, III.

6' arm 19" col. CARLTON RADIAL DRILL. 48 Spindle Speeds 10 to 1000 RPM. 20 HP. A.C. Motor Drive. New in 1943. Inspection under power.

FALK MACHINERY COMPANY

THE CLEARING HOUSE

WORLD'S LARGEST STOCK STAMPING PRESSES

BLISS . CLEARING . CLEVELAND FERRACUTE . HAMILTON . L & J NIAGARA . TOLEDO . V & O



SQUARING SHEARS . PRESS BRAKES REBUILT and GUARANTEED

JOSEPH HYMAN & SONS

TIOGA LIVINGSTON & ALMOND STS. PHILADELPHIA 34, PA. Phone GArfield 3-8700

FOR SALE

SUBJECT TO PRIOR SALE

Lapper, Cincinnati Centerless, Model EO, Serial #5M-2H-1K10. Excellent condition. Have extra spindle which can be used on regulating or lapping wheel. Additional equipment includes two (2) new lapping wheels and one (1) regulating wheel.

Contact: Hubert Songer

Airtex Products Inc. Fairfield, Illinois

FOR SALE

Furnaces, Immediate Delivery

Two-E. F. Roller Hearth, gas fired, 1850°F, 66" W x 46" H x 48' Long, complete with controls & electrical-new 1951. One-Despatch Electrical Oven, continuous mesh belt, 52" W x 40" H x 30' Long, with cooling chamber, complete with controls & electrical-new 1952.

Amco Machinery Co. 125 Leib Street, Detroit 7, Mich. LOrain 7-1070

50 TON HYDRAULIC RIVETER

8" reach, 16" gap, Stationary riveter.
Cap. 1/4" hot, 1/2" cold rivets.
Completely self contained unit.
Vickers Pumps, 10 HP GE Motor 220/44 self contained unit. nps, 10 HP GE Motor 220/440 V-AC.

F. H. CRAWFORD & CO., INC. 30 Church St., New York 7, N. Y.

LIFTING MAGNETS

A complete magnet service. Magnets, new & rebuilt, generators, controllers, reels, etc. Magnet specialists since 1910

Goodman Electric Machinery Co. 1060 Broad St. Newark 2. N. J.

eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

No. 4XB Robertson Economy Saw, m.d., new No. 48 Robertson Economy Saw, m.d., new Gustav Wagner Cold Saw, m.d. 6x6" Peerless Hack Saw

31A Cochran Bly, latest

No. 3 Motch & Merryweather, 1944

No. 328 Cochran Bly Saw, m.d., latest

Gema "Coyptor" Duplicating Attachment, m.d. 12"x8" Lodge & Shipley, m.d. 12"x84" centers Lodge & Shipley Geared Head, m.d., taper

13"x48" centers Pratt & Whitney Geared Head,

14x30" centers Monarch Geared Head, m.d. 14"x32" centers Cincinnati Geared Head, m.d.,

14"x6" Hendey Geared Head, m.d., taper

14"x6' Lodge & Shipley Geared Head, m.d.

14"x6' Pratt & Whitney, cone

14"x6' LeBlond, cone

14"x6' LeBlond Geared Head, s.p.d.

14"x6" bed Monarch, cone, motorized

14"x6' Sidney Geared Head, m.d.

14"x6' Springfield Geared Head, m.d., taper

14"x78" Hendey Geared Head, m.d.

15"x48" LeBlond Lathe

16"x30" centers Cincinnati, m.d.

16"x30" centers Monarch, m.d., taper 16"x78" centers Monarch Geared Head, m.d.

16"x6" bed Cisco Geared Head, m.d.

16"x6' Hendey Geared Head, m.d. 16"x6" Hendey Yoke Head, m.d., taper

16"x6' Lehmann Geared Head, m.d.

16"x6" Lodge & Shipley Selective Head, m.d.

16"x6" bed Monarch Geared Mead, m.d.

16"x8' Monarch, cone, motorized

We carry on average stock of 2,000 machines in our 11 acre plant at Cincinnati. Visitors welcome at all times.

THE EASTERN MACHINERY COMPANY

1002 Tennessee Avenue, Cincinnati 29, Ohio

MElrose 1241

CABLE ADDRESS-EMCO



BARGAIN - EXCELLENT

10-16' Niles with extension boring reach, variable speed motor drive \$12,500.00

T. R. Wigglesworth Machinery Company 1721 Superior Ave., Cleveland, Ohio Superior 1-8727

PRACTICALLY NEW DOUBLE S CRANK PRESSES

Bliss No. 9-108W, cap. 400 tons, Bed 108" x 60". Bliss No. 8-120, cap. 290 tons, Bed 120" x 50". Minster No. 50-7-72, cap. 200 tons, Bed 72" x 50". Bliss No. 6-84W, cap. 140 tons, Bed 84" x 36". Bliss Toledo No. 931/2-J, cap. 140 tons, Bed 108" x 48".

ALL MACHINES HAVE AIR CLUTCH AND SOME HAVE AIR CUSHIONS AND MOTOR DRIVEN RAM ADJUSTMENTS. STILL SET UP IN PLANT.

"If it's machinery we have it."

NATIONAL MACHINERY EXCHANGE 128 Mott St. New York 13, N. Y. **~~~~~**

CAnal 6-2470

300 Ton National Maxipress, Model 11/2 1939, Bed 17 x 23, 125 Strokes P.M. 50 Ton Derr-Patterson Hydraulic Press 1943, 4 Post, Plates 28 x 28, Up Moving Ram, Streke 15", 24" Daylight 72" Bullard Vert. Bering Mill DC Drive, Older, Excellent

FRANK BACON MACHINERY SALES

1039 West State Fair Street
Detreit 3, Mich. Townsend 9-9424

Fellows No. 4B Gear Burnisher. Gleason 3" Str. Bevel Gear Gen. Fellows Str. Line Gear Generators. K & T No. 2B Plain Mill, M.D.

D. E. DONY MACHINERY CO. 4357 St. Paul Blvd. Rochester 17, N. Y.

FOR SALE

Industrial Heat Treat Furnaces Complete-Like New Immediate Delivery

G.E. ROLLER HEARTH 465 KW, 1650 deg. F, 5' wide, 18" high, 20' long 6' 40' cooling. G.E. ROLLER HEARTH que fired, rad, tube. S' wide, 18" high, 18' long 6' 40' cooling. G.E. PUSHER 240 KW, 1650 deg. F, 4' wide, 12" high, 22' long, quench conveyor. 4000 CFH. EXO GEN. w/each above furn. YOUNG BROS. GAS RECIRC. CONV. BELT. 1000 deg. F, 6' wide, 24" high, 45' Ig. NEW 500 C.F.H. Westinghouse Endothermic Gen. LINDBERG ELECT. PIT CYCLONE, 28" x 28", 1250 deg. F. SURF. COMB. GAS BOX. 4'6" wide, 12'

SURF, COMB. GAS BOX, 4'6" wide, 12' long, 30" high, 1850 deg. F. 2000 ft. Mechanical Handling System No. 458 Chain with trolley & clevice assem-

PAPESCH & KOLSTAD, Inc.

10707 CAPITAL AVENUE Oak Park (Detroit 37), Mich. Phone: Lincoln 7-6400

71/2" BAR, PLANER TYPE INGERSOLL HORIZONTAL BORING. DRILLING & MILLING MACHINE

Table 60" x 120" Motor & Controls Rebuilt

LANG MACHINERY COMPANY

28th St. & A.V.R.R. Pittsburgh 22, Pa.

FOR SALE

Heller Universal Cold Saw complete with motor, control, table. Includes Heller Saw Sharpener and a let of 26" & 28" saws. Machine capacity up to 8½" round stock. In excellent condition. Priced to move from storage quickly. For price and details.

ADDRESS BOX G-276
Care The Iron Age. Chestnut & 56th Sts., Phila. 39

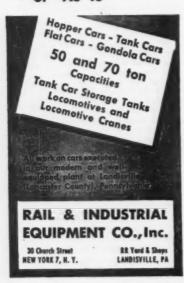
THE CLEARING HOUSE

FOR SALE

R.R. EQUIPMENT

Immediate Delivery

- · REPAIRED
- REBUILT
- or "AS IS"



FOR SALE

RECONDITIONED

RAILROAD CARS FOR INTERPLANT USE

GONDOLAS—BOX—FLAT

ERMAN-HOWELL DIVISION LURIA STEEL AND TRADING CORP.

332 S. MICHIGAN

WEBSTER 9-0500

CHICAGO, ILL.

RAPER SUPPLIES

New RAILS Relaying

TRACKWORK of all KINDS

LIGHT RAILS—12# TO 60#—20'0" & 30'0" HEAVY RAILS—60# TO 100#—30'0" & 33'0" JOINT BARS, BOLTS, TIE PLATES, SPIKES & TOOLS, FROGS, SWITCHES, STANDARD & SPECIAL TRACKWORK.

SEND US YOUR INQUIRIES

ALSO 'N STOCK
STEEL
SHEETS & PLATES
STRUCTURALS
and Aluminum Products

BOX

KASLE STEEL CORPORATION

BOX 536 ROOSEVELT PARK ANNEX, DETROIT 32, MICH.—PHONE TIFFANY 6-4200

FOR SALE

Chemical distillation and vacuum apparatus, also controls, chemical glassware, etc. Original cost approximately \$100,-000. Will sacrifice. Can be seen at convenience.

Contact George A. Smith at

MAGIC CHEF, Inc.

5012 Daggett Avenue St. Louis 10. Mo.

SAND BLAST EQUIPMENT

ALL TYPES

BUY

SELL

World's largest supplier of good used Sand
Blast and Dust Collecting Equipment. Wheelabrators—Pangborn. CALL

WRITE

WIRE

abrators—Pongborn.

DIAMOND SALES INC.

5654 West Jefferson Ave. Detroit 9, Michigan
Telephone Vinewood 3-6750

OFFERING

BRIDGE CRANES

ARNOLD HUGHES COMPANY
765 Penobscot Bidg. Detroit, Mich.

RAILS

 500 Tons 80# ASCE
 Relay

 400 Tons 90# ARA-B
 Relay

 150 Tons 90# ASCE
 Relay

TIE PLATES • Excellent Relay TURNOUTS—LIGHT RAILS TRACK ACCESSORIES

MORRISON RAILWAY SUPPLY CORP. B14 Rend Bidg. Buffalo 3, N. Y.

DAVIDSON PIPE COMPANY INC.

ONE OF THE LARGEST STOCKS IN THE EAST Seamless and Welded 1/6" to 26" O.D. All wall thickness Manufactured.

All wall thickness Manufactured.

Specialty large sizes.

Cutting — Threading — Flanging —

Fittings — Valves.

Call GEdney 9-6300 50th St. & 2nd Ave., B'klyn 32, M. Y.

Have you any factories or plant sites to sell? This space would place you in touch with interested parties, as over 100,000 men read

THE IRON AGE

FOR SALE

FREIGHT CAR REPAIR PARTS
RELAYING RAILS & ACCESSORIES
STEEL STORAGE TANKS
FRT CARS & LOCOMOTIVES
CONTRACTOR EQUIPT. &
MACHINERY

THE PURDY CO.

8754 S. DOBSON AVE.
CHICAGO 19, ILL. — BA 1-2180
ALSO ST. LOUIS, MO.—SAN FRAN., AND
LONG BEACH, CALIF.

New RAILS Relaying

We carry frees, switches, spikes and belts in steck and most all sections of rails and track accessories. M. K. FRANK

480 Lexington Ave., New York, N. Y. Park Building, Pittsburgh, Pa. 105 Lake St., Reno, Nevada

FOR SALE

200 KW Tocco Induction Unit-3000 Cycle, 3 Station Setup, Complete-Excellent condition.

PAPESCH & KOLSTAD, INC. 18707 Capital Ave., Oak Park (Detrait 37), Mich. Phone: Lincoln 7-4400

I—Tabor Abrasive Cutoff Machine with 10 horsepower motor. Has had very little use. Looks and runs like new.

ADDRESS BOX G-277
Care The Iron Age, Chestnut & 56th Sts., Phila. 39

EQUIPMENT AND MATERIALS WANTED

WANTED SURPLUS STEEL WALLACK BROTHERS

7400 S. Domen Ave.

Chicago 36, Illinois

WANTED

Industrial furnaces and heat treating equipment of all kinds.

THE JOE MARTIN CO., INC. 19256 John R., Detroit 3. Mich. TWinbrook 2-9400

WANTED

PIPE & TUBE BENDERS Pines, Wallace or Equal

ADDRESS BOX G-289 Care The Iron Age, Chestnut & 56th Sts., Phila, 39

WANTED TO BUY Used crane runway

Runway, Rails and supporting A frames for a 15 ton Bridge Crane. 56 ft. 11 in. span x 240 ft. of travel. Foundation to top of rails 40 ft. Crane wheel load 30,500# on 11 ft. 9 in. wheel base,

ADDRESS BOX G-290 Care The Iron Age, Chestnut & 56th Sts., Phila. 39

WANTED

Steam Forging Press

750 to 1200 Ton Capacity. Furnish full particulars.

ADDRESS BOX G-272 Care The Iron Age, Chestnut & 58th Sts., Phila. 36

WEISS STEEL CO. INC.

600 WEST JACKSON BLVD. CHICAGO 6 ILLINOIS Buyers of Surplus Steel Inventories

WANTED BRIDGE CRANES

ARNOLD HUGHES COMPANY 765 PENOBSCOT BLDG. DET WOodward 1-1894 DETROIT, MICH.

EMPLOYMENT EXCHANGE

EMPLOYMENT SERVICE

HIGH GRADE MEN—Salaries \$5,000 to \$25,000. Since 1915 thousands of Manufacturing Executives, Engineers, Sales Managers, Comprollers, Accountants and other men of equal calibre have used successfully our confidential service in presenting their qualifications to employers. We handle all negotiations. Submit record with inquiry. The National Business Bourse, 20 W. Jackson Blvd., Chicago 4.

HELP WANTED

SALES REPRESENTATIVES WANTED: Experienced in metalworking field. Positions open with established company now supplying hundreds of plants with semi-hydrogenated chemicals for drawing, forming, stamping, and cutting hard metals such as stainless steel, chrome, nickel, and titanium. Wonderful opportunity for those who can qualify. Territories open in New England States, Southern States, and Midwest exclusive of Wisconsin and Michigan. Address Box G-292, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

MELTING METALLURGIST — Tool Steels — Stainless Steels—Superalloys. Staff level for manufacturing control, research and development on melting practice — induction and are furnaces; specific experience in these alloys required. Some consultation with customers. New operation in old established company. Salary open. Location—Industrial Great Lakes. Address Box G-287, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

SALESMAN-ENGINEER to act as sales man-SALESMAN-ENGINEER to act as sales man-ager of long established engineering and fabricat-ing company in Cleveland, Ohio. We are looking for an ambitious and competent experienced man-ager who can develop new products and supervise our sales organization. Give all details of age, experience, education and salary expected. Ad-dress Box 6-294, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

BOLT, NUT & SCREW MANUFACTURER—Vell established—Desirve for its Chicago Plant

ASST. GERERAL FOREMAN
with set-up experience on cold headers and other machines.

ASST. COLD HEADER FOREMAN
with set-up experience.

COLD HEADER AND MEN
State age, personal instory, physical condition, set-up experience, supervisory experience, if any, and salary desired.

ADDRESS BOX 6-285
Care The Iron Age. Chestnut & 56th Sts. Phila. 39

HELP WANTED

TECHNICAL DIRECTOR

Will direct research and development activities of moderate size manufacturer. Problems are in chemical and metallurgical fields. Every major industry uses company products.

Ability to organize and inspire scientists and engineers important. Outstanding performance will be immediately recognized and rewarded.

Starting salary \$12,000-\$15,000. Company assumes agency fee and relocation expense

MONARCH PERSONNEL

28 E. Jackson Boulevard, Chicago 4, Illinois

SALES MANAGER

Familiar with stainless steel and high temperature alloys. Technical back-ground preferred. Location western Michigan.

GEORGE & DIX, Mgt. Consultants Federal Square Bldg., Grand Rapids, Michigan

ASSISTANT PLANT MANAGER to assist in managing of cast iron plumbing fixture plant. Give full particulars. Good opportunity and salary. Address Box G-291, care *The Iron Age*, Chestnut & 56th Sts., Philadelphia 39, Pa.

METALLURGICAL ENGINEER, UPPER NEW ENGLAND—A rapidly growing instrument ball bearing company wants an alert and aggressive young metallurgical engineer. Opportunity for advancement. New plant with new equipment. Write giving qualifications. Information confidential. Address Box G-288, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

CLEANING ROOM FOREMAN—Most modern and progressive steel foundry in the Middle West. Advise full particulars. Swedish Crucible Steel Co., 8561 Butler Ave., Detroit 11, Michigan.

SITUATIONS WANTED

WORKS MANAGER-GENERAL SUPERIN-WORKS MANAGER—GENERAL SUPERIN-TENDENT. Strong background in heavy pressure vessel beat-exchangers catalyst cracking units, towers, and other heavy equipment constructed from steel, stainless steels, aluminum, nickel, monel, etc., for the oil, chemical and processing industries to the specifications of the A.S.M.E., AP.I. and A.W.S. Codes. Familiar with the tech-niques of automatic welding X-ray and modern manufacturing methods and systems. Minimum salary \$12,000. Address Box G-286, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39, Pa.

MANAGER — METALLURGICAL ENGI-NEER, with fifteen years' steel plant production management and metallurgical experience plus five years as project engineer on plant design and con-struction. Interested only in challenging position affording major responsibility. Address Box G-293, care The Iron Age, Chestnut & 56th Sts., Phila-delphia 39, Pa.

SUPERINTENDENT; with years of experience, seeking small progressive organization, trained Mechanical Engineering, Industrial Management, some accounting, creative ability. Address Box G-283, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39.

SUPERINTENDENT with wide experience in both Production and Jobbing Shops, Production, Cost and Quality Control, Jigs, Fixtures and Tooling both Structural and Machine, would like to make a change. Address Box G-275, care The Iron Age, Chestnut & 56th Sts., Philadelphia 39.

GENERAL MANAGER OR CONSULTANT in welded fabrication of machinery, pipe, plate and sheet products, modernizing of welding, handling, incentives and product design. Contract or consulting basis. Mid Atlantic or New England locations. Address Box G-273, Care The Iron Age. Chestnut & 56th Sts., Philadelphia 39.

THE BEST

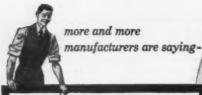
USED EQUIPMENT

CLEARING HOUSE

SELL YOURS

THE EASY WAY

THROUGH AN AD IN THE IRON AGE



"Let's use GRIFFIN COLD ROLLED STRIP STEEL"

Made to your specifications in all thicknesses from .002 to .375 inches and widths from ½" to 19" depending upon gauge.

Heavier gauges to special order.

NARROW ROLLED ROUND EDGE STRIP STEEL

In stock at

CENTRAL STEEL & WIRE CO.
Detroit, Chicago, Cincinnati
Wm. H. LEONORI & CO., Inc.
New York City



MANUFACTURING CO. ERIE, PA.





Cutting off Machines for Sawing All Kinds of Metals

THE ESPEN-LUCAS MACHINE WORKS FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.





THE EASTERN MACHINE SCREW CORP., 21-41 Burday Street, New Haven, Conn. Pacific Coast Representative: A. O. Behringer, Inc., 334 N. See Pedre Bt., Lea Angoles, Calsfornie Canada: F. F. Berber Machinery Oo., Toronto, Conade

GOSS and DE LEEUW

CHUCKING MACHINES

Tool Rotating Type.

ADVERTISERS IN THIS ISSUE

An asterisk (*) beside the name of advertiser indicates that a booklet, or other information, is offered in the advertisement. Write to the manufacturers for your copies today.

A	D
Air Products, Inc %	Davidson Pipe Co., Inc 150
Airtex Products Inc	Donahue Steel Products Co., Inc. 148
*Alco Products, Inc 18, 19	Dony, D. E. Machinery Co 149
*Allegheny Ludium Steel Corp 131	bony, or at mountary con training
Allis-Chalmers Mfg. Co14, 15	
Amco Machinery Co	
American Brass Co., The 69	E
American Cast Iron Pipe Co.,	Eastern Machine Screw Corp., The
*American Chemical Paint Co 30	152
American Steel & Wire Div., United States Steel Corp.	Eastern Machinery Co., The 149 *Electric Controller & Mfg. Co., The
Between Pages 16 & 17	*Electric Steel Foundry Co20, 21
*American Welding & Mfg. Co.,	Enterprise Galvanizing Co 145
The 58	Espen-Lucas Machine Works, The 152
Armel, James P	
*Armstrong Bros. Tool Co 145	
	F
	Fabrikant Steel Products, Inc 147
	Falk Machinery Co
*Babcock & Wilcox Co., The Tubu-	
lar Products Div	*Ferro Corp. 153 First Boston Corp., The
Bacon, Frank, Machinery Sales 149	Foster, Frank B., Inc
Bailey, William M., Co	Frank, M. K
Baker Industrial Truck Div. of The Baker-Raulang Co	Frank, M. K.
Baldwin-Lima-Hamilton Corp 95	
*Barium Steel Corp	6
Belyea Co., Inc	
Bennett Machinery Co	Gardner Machine Co
*Bergander Mfg. Co	Garrett, Geo. K., Co., Inc 9
Bertsch & Company 145	Gleason Works 71
Bethlehem Steel Co	Globe Steel Abrasive Co 94
Bridgeport Brass Co 64	Goodman Electric Machinery Co. 149
Browning, Victor R., & Co., Inc 152	Goss & DeLeeuw Machine Co 152
*Bullard Co., The	Greenpoint Iron & Pipe Co., Inc. 148
By-Products Steel Co., Div. of	George & Dix
Lukens Steel Co	Griffin Manufacturing Co 152
c	н
Carpenter Steel Co., The 105	Hannifin Corp
Chase Brass & Copper Co 135	LIGIDISON- A GIVEL MELLOCIONES OF
Chicago Electric Co 141	Fieldlick Mondidant
*Chisholm-Moore Hoist Div.,	
Columbus McKinnon Chain	Hewitt-Robins Incorporated72, 73 Hoskins Manufacturing Co.
Corp	
*Cincinnati Milling Machine Co., The	Hughes, Arnold, Co
Clark Controller Co., The	Plymon, Joseph, & John
*Clark, Cutler, McDermott Co. Air-Loc Division	71,000
Colorado Fuel & Iron Corp., The Wickwire Spencer Steel Div 4	1
Columbia-Geneva Steel Div.,	
United States Steel Corp. Between Pages 16 & 1	Inland Steel Co
*Conco Engineering Works Crane	The state of the s
& Hoist Div	3
Consolidated Vacuum Corp 12	n
Continental Screw Co	
Crawford, F. H., & Co., Inc 14	
Curtis Manufacturing Co., Pneu-	Sales Inc., Kaiser Chemicals

Curtis Manufacturing Co., Pneumatic Division III Div.

ADVERTISERS IN THIS ISSUE

Kasie Steel Corp 150	Rail & Industrial Equip. Co., Inc. 150
Kennametal, Inc 125	*Raybestos-Manhattan, Inc. Man-
Kinderman, Lou F	hattan Rubber Div 16
*Kirk & Blum Mfg. Co 112	*Republic Steel Corp24, 25
	Rigidized Metals Corp 145
	Roebling's, John A., Sons Corp 99
L	*Ryerson, Jos. T., & Son, Inc 6
Lake Erie Engineering Corp. 26, 27	
Land, L. J., Inc	
Lang Machinery Co 149	S
*Leeds & Northrup Co.	
Between Pages 98 & 99	Sciaky Bros. Inc. Between Pages 48 & 49
Lincoln Electric Co 92	
*Link-Belt Co	Selas Corp. of America 74 *Sharon Steel Corp 8
win-Lima-Hamilton Corp 95	Shenango-Penn Mold Co 93
*Lukens Steel Co109-154	*Standard Conveyor Co 104
Lumnite Bureau, Universal Atlas	Stanhope, R. C., Inc
Cement Co. Between Pages 16 & 17	Stevens, Frederic B., Inc 101
Luria Bros. & Co., Inc	*Superior Tube Co
Luria Steel and Trading Corp 150	Swedish Crucible Steel Co 151
	Swedish Cracion Steel Co. 1
м	
	T
MacCabe, T. B., Co	- Carl & Issa Div
Mackintosh-Hemphill Division of	Tennessee Coal & Iron Div.,
E. W. Bliss Co 51	United States Steel Corp. Between Pages 16 & 17
*Mahon, R. C., Co., The 91	*Thomas Flexible Coupling Co 123
Magic Chef, Inc 150	Thomas Machine Manufacturing
Manhattan Rubber Div. Raybestos- Manhattan, Inc	Co 54
*Manning, Maxwell & Moore, Inc. 106	Thomson Electric Welder Co. 22, 23
Martin, Joe, Co., Inc., The 151	Timken Roller Bearing Co., The
Miles Machinery Co 147	Back Cover
*Minnesota Mining & Manufactur-	Towmotor Corp 143
ing Co 115	
Monarch Personnel	
Morrison Railway Supply Co 150	U
	Udylite Corp., The
N	Halfard Engineering & Foundry Co.
National Acres Co. 23	Between Pages 98 & 99
National Acme Co., The 70	*United States Steel Export Co.
National Business Bourse, Inc 151 National Machinery Exchange 149	Between Pages 16 & 17
	United States Steel Corp. Between Pages 16 & 17
National Steel Corp 47	United States Steel Supply Div.,
National Tube Div., United States Steel Corp. Between Pages 16 & 17	United States Steel Corp.
*Nelson Stud Welding Div. of	Between Pages 16 & 17
Gregory Industries, Inc 108	
*New York & New Jersey Lubri-	
cant Co 124	
*North Carolina Dept. of Conser-	w
vation & Development 13	Wallack Bros 151
	Ward Steel Co
	*Weirton Steel Co
0	Weiss, B. M., Co
	Weiss Steel Co., Inc
Osborn Mfg. Co., The 5	*West Disinfecting Company 122
	*Wheelabrator Corporation 68
	Wickwire Spencer Steel Div., The
	Colorado Fuel & Iron Corp 48
,	Wigglesworth, T. R., Machinery
*Pangborn CorpInside Back Cover	
Paperch & Kolstad, Inc 149-150	
*Pittsburgh Steel Co28, 29	
Platt Bros. & Co., The 145	
Purdy Company, The 150	CLASSIFIED SECTION
	Clearing House146-150

Contract Manufacturing Appears In first and third issue of each month. See Mar. I & Mar. IS

44 Equipment & Materials Wanted. . 151

Employment Exchange



PICKLING TANK TEST in 3 minutes with FERRO PICKLE PILLS



As easy as 1...2...3. Any workman who can tell red from green and count to ten can test the exact strength of pickling solutions... the exact percentage of iron. That's why Ferro Pickle Pills have been standard equip-

ment in the best pickling rooms for years. They're efficient, economical and easy to use.



Ferro Pickle Pills provide a quick, accurate test to augment periodic titration testing, or as a "test within a test". They assure full-capacity cleaning with fewer rejects because tank solutions can be controlled at the

required strength. You save money by eliminating costly, premature dumping of tanks.



There's a Ferro Pickle Pill for almost every pickle room need . . . a simple, sure way of determining the solution percentage of sulphuric acid, muriatic acid, alkali and metal cleaning tanks . . . or the iron content of any solutions.

Try Ferro Pickle Pills in your pickling room. One test will convince you.

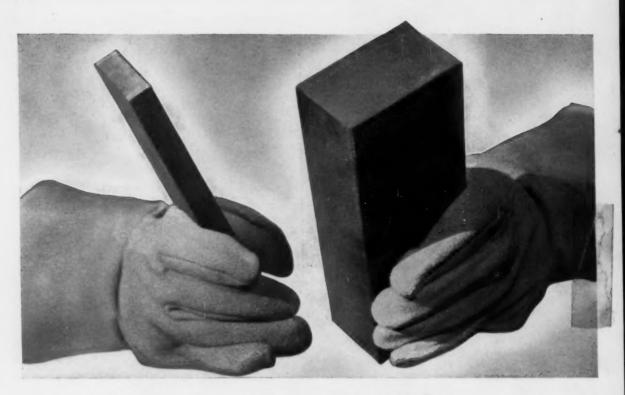
Write today for literature and prices!



FERRO CORPORATION
Supplies Division

4150 EAST 56th STREET - CLEVELAND 5, OHIO

Quaker Rubber Div. of H. K. Porter Co., Inc.



Which is the ECONOMY SIZE?

3 times stronger than carbon steel, Lukens "T-1" steel slashes equipment weight, reduces costs

The lighter weight, reduced thickness of Lukens "T-1" steel, in comparison to heavier, thicker plates of ordinary carbon steel, makes possible substantial over-all savings in material and fabrication costs for equipment builders. This new all-purpose steel—a unique, low-carbon, quenched and tempered alloy plate steel—has a yield strength three times greater than ordinary carbon steel. It can cut costs by reducing weight and still increase payload and efficiency.

Equipment fabrication is no problem with Lukens "T-1" steel. It is readily welded—often without preheating or stress relieving—and can easily be fabricated, modified or repaired at the field site. Its exceptional toughness and resistance to wear and impact lowers maintenance costs and lengthens equipment life. Additional savings are pos-

sible where Lukens' range of steel plate sizes—including the widest and heaviest available anywhere—makes possible the use of wider sizes that require fewer welded seams.

Lukens "T-1" steel is the most recent addition to Lukens' complete line of carbon, alloy and clad steels. Its unusual combination of properties suit it especially to application in pressure vessels, bridges, shipbuilding, construction machinery and general industrial equipment. On problems of design, selection, application and fabricating techniques, Lukens offers full technical assistance. If you would like further information on Lukens "T-1" steel, write for Bulletin 765 on its properties, characteristics and applications. Address: Manager, Marketing Service, 774 Lukens Building, Lukens Steel Company, Coatesville, Pa.

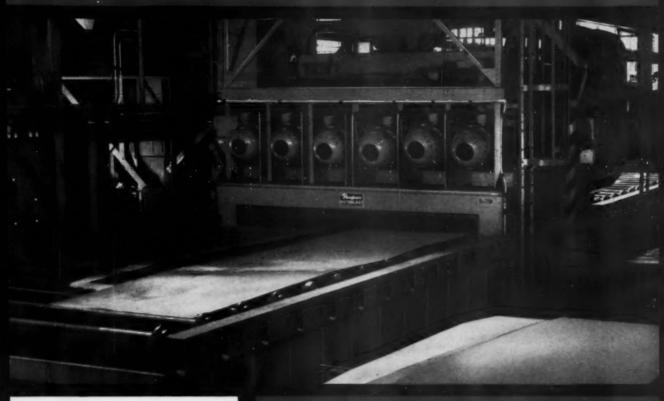


"T-1" STEEL

THE NEWEST IN A COMPLETE LINE OF ALLOY STEELS

LUKENS STEEL COMPANY, COATESVILLE, PENNSYLVANIA

Descale steel sheets, plates, coils



No more scale breaking or pickling! No more acid disposal problems! Pangborn Rotoblast Descaling Machines descale steel sheets, plates and coils, and they operate at big savings over pickling costs!

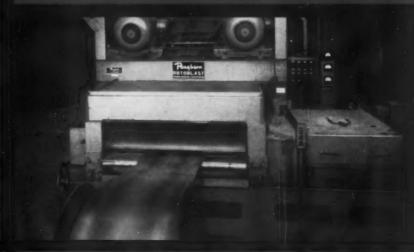
How? They work quickly. They clean thoroughly. They're a one-man operation. Unlike acid baths, they can be located near your production, cutting handling costs. And they save floor space, require much less room than vats. Available in a variety of models, Pangborn Rotoblast Descaling Machines handle steel sheets, plates and coils of any thickness, width and length. If you want to cut descaling costs to the bone, investigate Pangborn Descaling Machines!

For complete information, send for Bulletin 224. Write: PANGBORN COR-PORATION, 1500 Pangborn Blvd., Hagerstown, Maryland.

*U. S. Pat. #2184926 (other patents pending)

with Pangborn

at less than half the cost











Rotoblast Blastmoster® Rotoblast Tables & Continuous-Flo Barrel & Table-Rooms



& Cabinets



Control Equipment



Shot & Grit



Morgan Cranes move hot slabs fast

...TIMKEN® bearings cut traveling costs

THESE Morgan heavy-duty cranes move hot steel slabs from cars to storage in an Eastern steel mill and do it fast. To be sure they keep rolling and at minimum cost, Morgan engineers mounted the idler and driver track wheels on Timken® tapered roller bearings. They keep them on the go with minimum maintenance.

The tapered construction of Timken bearings lets them take both radial and thrust loads in any combination. And full line contact between the rollers and races gives Timken bearings extra load-carrying capacity. They can take the heavy thrust loads of crane operation in stride. No addi-

tional thrust devices are needed. Longer bearing life is assured. Cranes keep rolling.

Timken bearings practically eliminate friction because they are designed by geometrical law to have true rolling motion and are made microscopically accurate to conform to their design. Because friction is reduced wheels and loads roll smoothly. Costly maintenance drops, power is saved.

And by holding housings and shafts concentric, Timken bearings make closures more effective. Dirt and dust stay out; lubricant stays in. Lubricant and upkeep costs are also decreased. What's more, to be sure of toughest, finest bearing steel, we make our own. We're America's only bearing manufacturer that does.

Only Timken bearings give you so many advantages. Always specify Timken bearings for the machines you buy or build. Be sure the trademark "Timken" is on every bearing—it's your assurance of full, moneysaving value. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".



This symbol on a product means its hearings are the hest.



Because the load is carried on the line of contact between rollers and races, Timken bearings carry greater loads, hold shafts in line, wear longer. Only Timken tapered roller bearings have these advantages: 1. advanced design: 2. precision manufacture; 3. rigid quality control; 4. Timken fine alloy steels.





NOT JUST A BALL O NOT JUST A ROLLER THE TIMKEN TAPERED ROLLER DEARING TAKES RADIAL DAND THRUST -D-LOADS OR ANY COMBINATION -D